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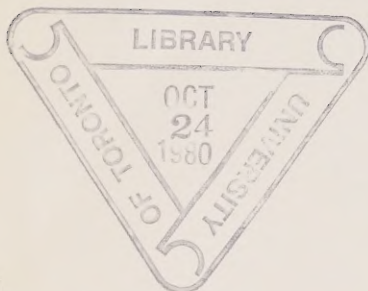
# ontario hydro news

january/1969

*Hydro-electric  
power commission.*







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## the cover

Construction forces are working around the clock to bring the huge Pickering nuclear station, east of Toronto, into full service by 1973. First power is timed for 1971. For Ontario Hydro, last year can justifiably be labelled the Year of the Atom. A commitment was made for the construction of an even larger nuclear plant on the shore of Lake Huron.

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## Viewpoint

# bignumberitis

Resistance to disease can be built up through constant exposure and one of the afflictions against which we are rapidly developing immunity is bignumberitis. Size is only meaningful in terms of comparison and big numbers tend to bounce off skins which have grown calloused by long contact with zillions of zeros.

Hydro itself is in the major leagues when it comes to tossing big numbers around. Some of the figures associated with last month's announcement of the two new generating stations are definitely of the mind-boggling variety.

Think about the new development in terms of power output. Together these two stations will have a capacity of 5,000,000 kilowatts. Is that a lot?

It's enough to supply twice the electrical requirements of every house in the province. The coal-fired plant scheduled for construction near Kingston will produce more than enough power to meet the present requirements of all four Maritime provinces. Its larger nuclear counterpart to be built at Douglas Point would look after the electrical needs of Metro Toronto, Hamilton and London.

Set up in St. John's, Newfoundland, just one of the four 750,000-kilowatt nuclear units destined for Douglas Point would meet the island's entire electrical demands with a comfortable margin of reserve.

Looking for comparisons closer to home, it is worth noting that Hydro took more than 50 years to develop generating resources equal to the two recently announced stations. Difficult as it may be to conceive, the output of these two giants will equal the capacity of all of the hydro-electric plants in the East System, which includes those on the Niagara, St. Lawrence, Ottawa and Madawaska rivers as well as the complex on the northern rivers draining into Hudson Bay.

Another figure which is difficult to appreciate is the cost. Estimated in "today's terms" the combined price tag works out at \$1,035,000,000 — a figure which is very likely to be exceeded before the last invoice has been picked up.

That's a lot of money. If every man, woman and child in the province decided to share the bill, it would cost them about \$140 each. It equals well over half of the province's net capital debt and almost half of net total revenue for 1967. It's more than Ontario spent on education in 1967.

Interest is something else again. If the full amount was financed over 20 years at 7 per cent, interest would amount to \$1,449,000,000 — more than the original price tag.

Capital expansion on such an incredible scale involves everyone in the province and sends out economic repercussions across the country and well beyond its shores. More directly, it suggests the enormous responsibility which has been placed upon the shoulders of everyone in the power business from Ontario Hydro itself to the smallest municipal utility. Keeping abreast of the electrical requirements of one of the world's fastest growing areas is their underlying objective. And with demands doubling every 10 years the enormity of the challenge can scarcely be exaggerated. □



# the challenge of centennial plus one

centennial year plus one presented Ontario Hydro with its greatest challenge yet. Latest figures show that the increase in electrical demand exceeded 11 per cent. This is 1,000,000 kilowatts more than the abnormally low 1967 peak and is the largest year-to-year increase in our history.

On the supply side, although we're still plagued with problems of keeping prototype thermal capacity in service, a record-breaking one million kilowatts of new capacity was brought on line. Included were units six, seven and eight at Lakeview; the extension of Barrett Chute, two combustion turbine units at Thunder Bay G.S. and all power from Douglas Point.

Granted, some of this additional generating capacity was inherited from 1967 through delays caused by the summer construction strike, late delivery of equipment and teething problems. But the unexpected bonus does attest to the dedication and determination of Hydro's engineering and construction forces.

And this was accomplished in an inflationary atmosphere. Higher wages, climbing interest rates, increased costs for goods and services — all have caused the relentless upward movement in the cost of doing business. As an example, in the last decade the interest on money borrowed by Hydro has jumped 60 per cent.

In a booming province like Ontario, which today outstrips yesterday and tomorrow promises even more, it is only normal to look ahead. And so it is with Hydro, since doing things electrically has become a way of life.

Undoubtedly the most significant event in 1968, and one that will make the year notable in the history of nuclear energy, was the announcement a few weeks ago of plans to build two power stations with a combined output equal to half of the province's present power resources.

Coupled with the existing construction program these two new stations — one nuclear and one coal-fired — will

more than double our present capacity within a decade. By 1980 we foresee one-third of Ontario Hydro's generating capacity invested in nuclear stations, one-third in fossil-fuel plants and the balance in hydro-electric sources.

One of the new stations will be located on Lake Huron next to the existing Douglas Point nuclear plant. The other will be located on Lake Ontario at Bath, 22 miles west of Kingston.

The Lake Huron development will be a 3,000,000-kilowatt nuclear plant situated on a 2,300-acre tract purchased some time ago. It will have four 750,000-kilowatt units, the largest in the country. Subject to Atomic Energy Control Board approval, preliminary work will get under way this year. The first unit should produce power in 1976 with the three others coming into service in consecutive years.

Like other nuclear power plants in the province, the station will utilize the Canadian natural uranium-heavy water concept. Heavy water will come from a \$65 million manufacturing plant to be built by Atomic Energy of Canada at the same site. It will produce 400 tons of heavy water a year.

Using today's dollar as a yardstick, the new nuclear plant will cost about \$760 million. At the peak of construction, the work force will number 2,500 with thousands more being employed by suppliers.

The second generating station is located on land which Hydro optioned in 1967. It will have a capacity of 2,000,000 kilowatts from four identical coal-fired units. These units are planned to go into service between 1975 and 1977, with initial construction scheduled for next year. At current prices, the estimated cost of the plant will be \$275 million and will involve a peak work force of 1,800.

The nuclear station will be the second largest committed for construction anywhere in the world. Its output will increase Hydro's nuclear generation to 5.4 million kilowatts. Included in the total are AECL's existing Douglas Point station, which Hydro operates, and the 2,160,000-kilowatt Pickering

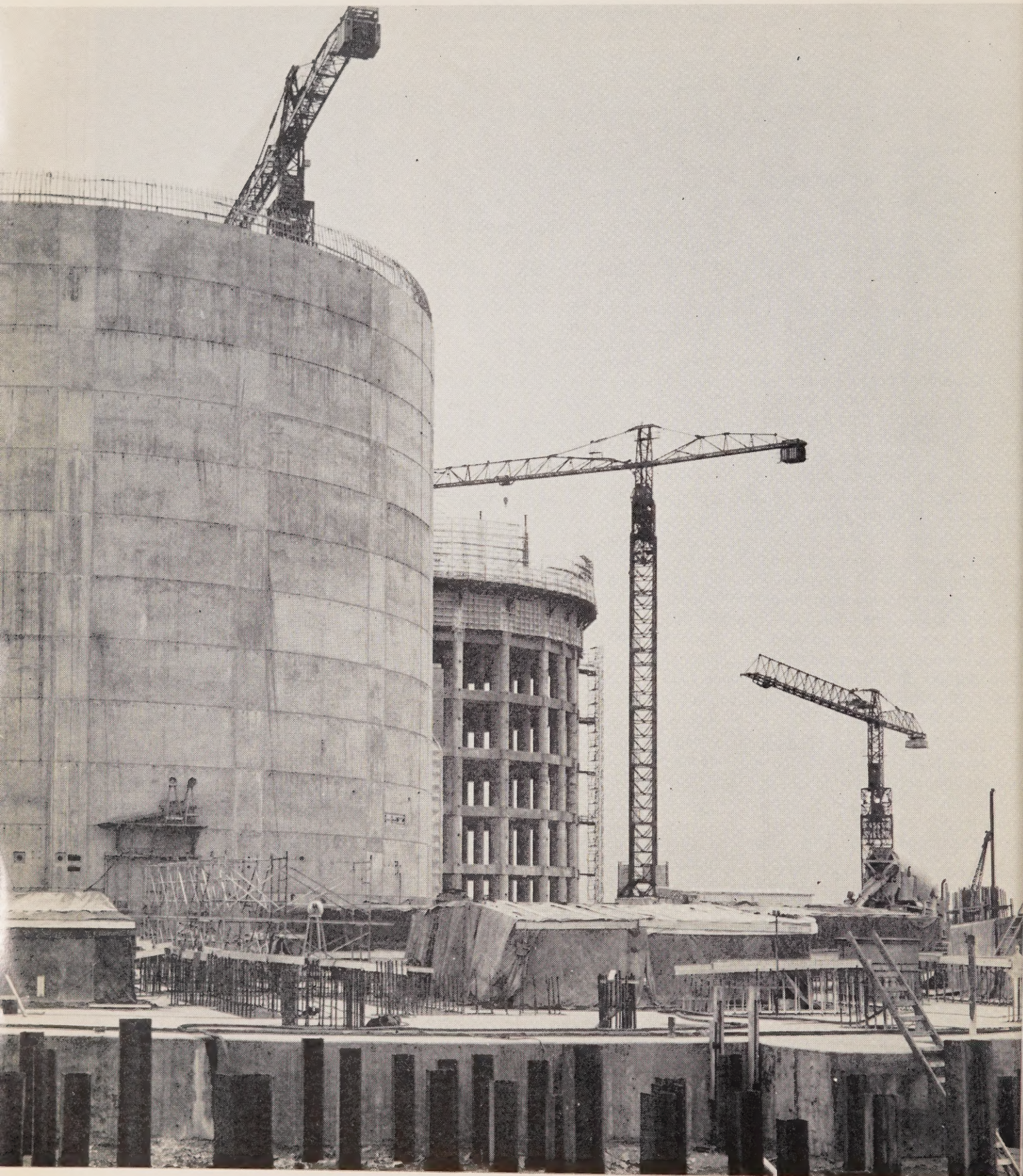


*Hydro Chairman George Gathercole*

**a year of  
unprecedented  
expansion  
accomplished in  
an atmosphere  
of inflation**



**nuclear generation now under construction  
or planned amounts to more than half ontario  
hydro's existing power resources**





*Tall cranes help erect a steel-and-concrete cage to contain the power of the atom at Pickering. Below, the snow-covered nuclear station at Douglas Point and the maze of catwalks and pipes high in the Lambton coal-burning station.*

nuclear project east of Toronto, being built by Hydro to AECL's reactor design.

Nuclear generation now under construction or planned amounts to more than half Ontario Hydro's existing power resources and demonstrates the Commission's faith in the atom.

The decision to proceed with the coal-fired plant meets our requirements of maintaining a pragmatic mix of nuclear, coal and hydro-electric power resources. Nuclear stations have exceedingly low fuel costs and lend themselves well to base-load operation. Conventional thermal stations can, on the other hand, be operated either as base-load or peaking stations.

With Ontario lacking resources of domestic coal while sitting on huge deposits of rich uranium and possessing a strong background in nuclear science, it is natural that Hydro should look to the atom. Were it not for nuclear power, our annual consumption of coal — most of which would be imported — could climb in a decade to 25 million tons, or about 225 million a year.

Another consideration under present conditions is the higher capital cost of nuclear stations — about double that of coal plants. To proceed with coal-fired plants will, therefore, impose a smaller demand upon the already overstrained capital market than if Ontario Hydro were to go all-nuclear in its expansion program.

To emphasize this aspect, because no utility has unlimited access to capital funds. Although the general growth of the economy is increasing the volume of savings and investment capital, competing uses for capital dictate that it be deployed efficiently.

And because of the competition, money is costing us more today. A decade ago, Hydro could acquire money at 4½ per cent or less. Its most recent bond issue, \$65 million, carried a coupon rate of seven per cent.

In 1968 alone, interest charges cost the Commission \$250,000 a day.

Wages, salaries, prices of materials, equipment and construction are all



undergoing this same pronounced upward trend. Average wages and salaries in the last five years have risen by 30 to 35 per cent. In the same period, the cost of building one mile of distribution line has jumped 15 per cent, and the cost of operating and maintaining it by almost 20 per cent.

In 1967, Hydro paid \$54 million in taxes, including grants in lieu of property taxes, water rentals, sales tax and duties. Of this, \$7.1 million went to municipalities and this figure alone is estimated to move to \$8 million for 1968. Naturally, Hydro is concerned with these rising costs and is doing everything it can to achieve economies and improve productivity. But present trends are of dimensions that cannot be absorbed by such processes.

Caught up in this disquieting inflationary phase, we have been forced to increase interim rates for power supplied to the municipal utilities. The new rates, which went into effect January 1, mean an average increase in power costs to the individual municipalities of 4.5 per cent. In some cases, the utilities will be able to absorb the adjustment under their existing rate structures. Others will be obliged to pass it on to their customers.

In the past few months, rates have also been increased to two other types of customer served directly by Ontario Hydro — retail customers in the rural areas and direct industrial customers.

Despite these adjustments, consumers in Ontario continue to benefit from rates that are among the lowest on the continent. The residential customer of a municipal utility in Ontario pays an average of \$80 a year for his power, a service that is available around the clock, 365 days a year. This works out to about 22 cents a day.

Mechanical difficulties involving two of the large steam generating units at Lakeview seriously reduced the margin of power Hydro hoped to have available to meet the traditional peak demands of December. However, both units were returned to service by the middle of the month.



tentative estimates call for an expenditure  
of \$350 million in 1969





*Two extra units are being added to the Stewartville hydro-electric station on the Madawaska River. Huge water intakes frame man-made gorge at Barrett Chute, also on the Madawaska, and construction machinery raises the dust at the embryo Wells station on the Mississagi.*

power resources actually stood higher than the anticipated 1968 peak, indicating a reserve of about 300,000 kilowatts over demand. But we had to consider the possibility of a serious breakdown in generation that could have pulled our resources below the demand level.

Another variable in producing power is nature itself. Water flows were down in the Ottawa and Madawaska rivers, normal on the Mattagami, but above normal on the Niagara. Because of this the Ontario and Toronto power stations on the Niagara River were able to produce more than their normal output.

Some cushion was provided in December by 350,000 kilowatts of interruptible power which can be cut in accordance with the contracts of large industrial customers. Hydro also received some assistance from interconnections with other utilities — but only on a day-to-day basis.

Capital expenditures are continuing at a high level. In 1967, the figure was \$252 million and it is expected that more than \$300 million will have been spent when everything is totalled for the year. Tentative estimates for 1969 call for a \$350 million expenditure. A large share of this expense is going toward generation facilities.

While few hydro-electric sites remain in Ontario that are capable of economic development, Hydro has four water-power projects underway at a cost of \$116 million. These will add 53,250 kilowatts to the system. Construction forces are squeezing additional kilowatts out of the three rivers — the Madawaska, Mississagi and Montreal — which have all contributed to power production through generations of an earlier era.

On the Madawaska, an 111,600-kilowatt extension costing \$15.5 million went fully operational last fall at the existing Barrett Chute station. Downstream, near the Madawaska-Ottawa River confluence, a two-unit extension of the Stewartville station will come into service this summer.



Mountain Chute generating station, although its capacity became available last winter, was officially opened in October by Prime Minister John P. Robarts.

On the Mississagi River, the \$27.4 million Aubrey Falls generating station is nearing completion. A six-and-a-half mile headpond will be formed when the spring run-off is held behind the two-unit station's main dam.

On the heels of Aubrey Falls comes the new Wells generating station, a 203,300-kilowatt plant next to the existing George W. Rayner station. Although the two plants will operate independently, they will both use the same headpond. One unusual aspect of the \$24.3 million Wells project will be the half-mile long tailrace.

Further north, on the Montreal River, a 2,000-foot diversion tunnel is swishing water around the main dam site for Lower Notch generating station. A half-mile intake channel will carry water from the dam area to the powerhouse's twin 114,000-kilowatt units. First power from the \$51.1 million station is scheduled for 1971.

Lakeview generating station, just west of Toronto, is in the shakedown stages on the last of its eight units. It marks the first time the sounds of construction from the site will be stilled in a decade. When the units are commissioned and teething troubles on earlier sections are soothed, the station's capacity will be 2,400,000 kilowatts.

To produce 4,000,000 kilowatts of electricity from coal, two other huge thermal stations are taking shape along the shores of the Great Lakes system.

Near Sarnia, our Lambton generating station is about to enter the production picture with a nominal output from the first of four 500,000-kilowatt units. The other units will be installed progressively for service this year and next.

Concrete placing has started on the Lake Erie shoreline, near Port Dover, for the \$266.5 million Nanticoke generating station. The plant will make available 2,000,000 kilowatts



**new line will link power utilities from  
saskatchewan to quebec**





*Excavation and dock construction proceeds as the huge coal-burning plant at Nanticoke, on Lake Erie, takes shape. Seen through the bubble of a Hydro helicopter is the Lakeview generating station, now extended to eight units.*

y 1974 with first power scheduled for 1971. Its most prominent feature will be a single, four-flued, 650-foot chimney that will disperse gases into the upper atmosphere.

A construction force of 2,100 is working around the clock to bring the massive Pickering nuclear power station east of Toronto into full service by 1973. Target date for first power from the plant, which ultimately will generate 2,160,000 kilowatts, is March, 1971.

Of course, all this additional capacity calls for new transformation, transmission and distribution facilities to handle the extra energy being fed into the provincial power grid.

Perhaps the most significant power line under construction is the east-west tie line, a 500-mile, 230,000-volt span that will bring together for the first time Hydro's two power networks — the East and West systems — and create a direct physical link between electrical utilities from Saskatchewan to Quebec. Phase one, which is now operational, allows the transfer of up to 50,000 kilowatts by means of interchanges with the Great Lakes Power Corporation. With the direct Hydro link scheduled for completion in May of next year, power transfers of up to 150,000 kilowatts will be possible in either direction. In 1972, other new northwestern lines will be utilized to carry power from Manitoba Hydro's Nelson River projects to Ontario. Under an inter-provincial contract, the initial purchase will be 50,000 kilowatts, rising to 100,000 in 1974 and decreasing to 50,000 in 1978, the contract's final year.

A power grid as large as Ontario's must be adequately protected and to this end a \$10 million microwave system that will safeguard a large portion of the Southern Ontario network is being installed. Another smaller but similar job involves 130 miles of the east-west tie line out of Sudbury. Under the microwave system, lines which show a malfunction will be replaced at the speed of light, avoiding any possible damage.

By far the greatest number of customers receive their power over the municipal distribution systems



and there are now 354 individual utilities buying energy at cost from Ontario Hydro. They range in size from urban giants to small commissions with only a few hundred customers.

Collectively, they wield great influence through the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities. In 1968, for instance, they presented briefs on a number of important issues including both regional government and taxation.

Although the staffs of these utilities have earned themselves a worldwide reputation for their competence and technical skill, they prefer not to rest on their laurels. Recognizing the importance of proper instruction, the AMEU is increasingly becoming training-oriented and one of the highlights last year was the introduction of its own training program for linemen. Underground distribution continues to gain importance at the municipal level and a vigorous underground program is being pursued in downtown areas and in new subdivisions across the province.

It is encouraging to see the number of utilities now involved in the "Tell the People" communications program. Recommendations and material produced by a joint OMEA-AMEU public relations committee are designed to help local hydro utilities communicate with employees, customers, local news media, municipal council, and others with whom they deal. Good relationships within the community are vital to any public enterprise and deserve the attention of every local commission.

About 160 utilities have adopted the now familiar Hydro symbol and more are soon expected to follow suit.

We welcomed Vaughan Township into the municipal family last year but lost two others, West Ferris and Widdifield townships, which were amalgamated with North Bay. The latter now has the distinction of possessing the largest acreage of any city in Ontario.

Despite our thin margin of capacity over demand, load building and load



we do not function in a vacuum and competition  
from natural gas and fuel oil is keen





*Representatives of the municipal utilities formulated Hydro policy at the local level in dozens of meetings across the province. Underground distribution and the promotion of all-electric homes claimed a great deal of their attention.*

Promotion continue to hold a prominent place in Hydro operations. We do not function in a vacuum and there is keen competition from the natural gas and fuel oil companies.

A large portion of the cost of supplying energy consists of the interest and principal on the investment in physical plant and equipment. For instance, virtually the same capital outlay in transmission and distribution facilities is needed whether the system supplies few or many kilowatt-hours of electricity. If little energy is transmitted over the system, the unit cost of power to the customer will be high; if much power is transmitted, the unit cost will be low.

Ontario Hydro has to build sufficient capacity to meet peak demands. But there are many times when our system has unused capacity. Accordingly, we try to fill in the valleys and build up a volume of business that can be translated into low kilowatt-hour costs.

The Electrical Modernization plan, introduced in Centennial year, is playing an increasingly larger role in this respect. Under the EM plan, Ontario Hydro is providing loans to help homeowners install such conveniences as up-to-date wiring, built-in appliances and electric heating and cooling systems.

Today, more than 1,600,000 residential customers of Hydro, the municipal utilities or private power companies can take advantage of the plan. Since it came into effect, some 600 contracts have been processed, representing a total of \$350,000.

At present, electric energy is used to heat over 70,000 homes and apartment suites in the province. Our forecast calls for electric heating to be installed in 25 per cent of the new dwelling units built this year. A considerable number of conversions from other forms of heat should also be effected.

Electric heating now represents a connected load in excess of a million kilowatts. Based on a revenue of \$200 annually for a single dwelling and \$100 for a multiple dwelling unit,



residential electric heating revenue amounted to \$9.9 million in 1967 and \$30 million since 1959.

Among load-building promotions during 1968 was a coast-to-coast campaign for no-frost refrigerators and freezers. Hydro was a major participant, joining with manufacturers, retailers and other utilities in educating the public about the advantages of these appliances.

One of the most significant steps in the marketing field is taking place in the southwest of the province. There, 12 municipal utilities and the Ontario Hydro Essex Area have banded together into what is called the Co-operative Marketing Plan-Essex County – COMPEC for short. About 32,500 customers are involved, almost half of them served by the utilities.

A multitude of promotional ideas and incentives have been scrapped across the county and replaced with a uniform approach. The success of the 18-month-old COMPEC scheme is illustrated in the new housing field, where four out of 10 dwellings were electrically heated in Essex county in 1968. This is almost double the province-wide figure. Similar marketing schemes are being set up elsewhere in the province.

All in all, 1968 has been a challenging year in every sphere of the Hydro operation, a challenge that has been met with enthusiasm and vigor by the entire organization. Yet the exciting developments in power generation during the past few weeks provide only a foretaste of what is in store.

We are an integral part of the whole community and must formulate policies and adopt practices consonant with changing social attitudes and standards. We must be prepared to adapt ourselves to the new conditions of the atomic age and assume a flexible stance which will give us the opportunity to participate fully in Ontario's great economic expansion. □



# heavy water weighs in

Why are Canadians spending a quarter of a billion dollars on two plants in Nova Scotia and another in Ontario that simply heat up water and extract a single pound for every 35,000 discarded?

That precious pound may look, taste and feel like ordinary water, but it commands a price of over \$20. What makes it so special is an infinitesimal particle trapped in the nucleus of the molecule's hydrogen atoms. This particle, or neutron, makes all the difference between water and deuterium oxide, commonly known as heavy water.

Today, there's a thirst for heavy water that will not be slaked until all three Canadian plants are in production. And if more

nuclear-electric stations are planned, as seems inevitable, the drought will continue. Construction of the Ontario plant on Lake Huron next to Douglas Point nuclear power station was announced last month. Atomic Energy of Canada Limited said it would build the \$65 million plant with an initial capacity of 400 tons a year. Steam, first from the present Douglas Point station and later from the giant 3,000,000-kilowatt nuclear plant to be built at the same site by Ontario Hydro, will be used in the extraction process.

Despite the world shortage, the bulk of the heavy water produced won't even leave Canada. Most of it is destined for nuclear power stations like Pickering, east of Toronto, Douglas Point, NPD at Rolphon and Gentilly in Quebec. But three stations of Canadian design in India and Pakistan will also need heavy water.

As a rule of thumb, nuclear stations require one ton of heavy water for each 1,000 kilowatts of capacity. A small operating loss is also incurred.

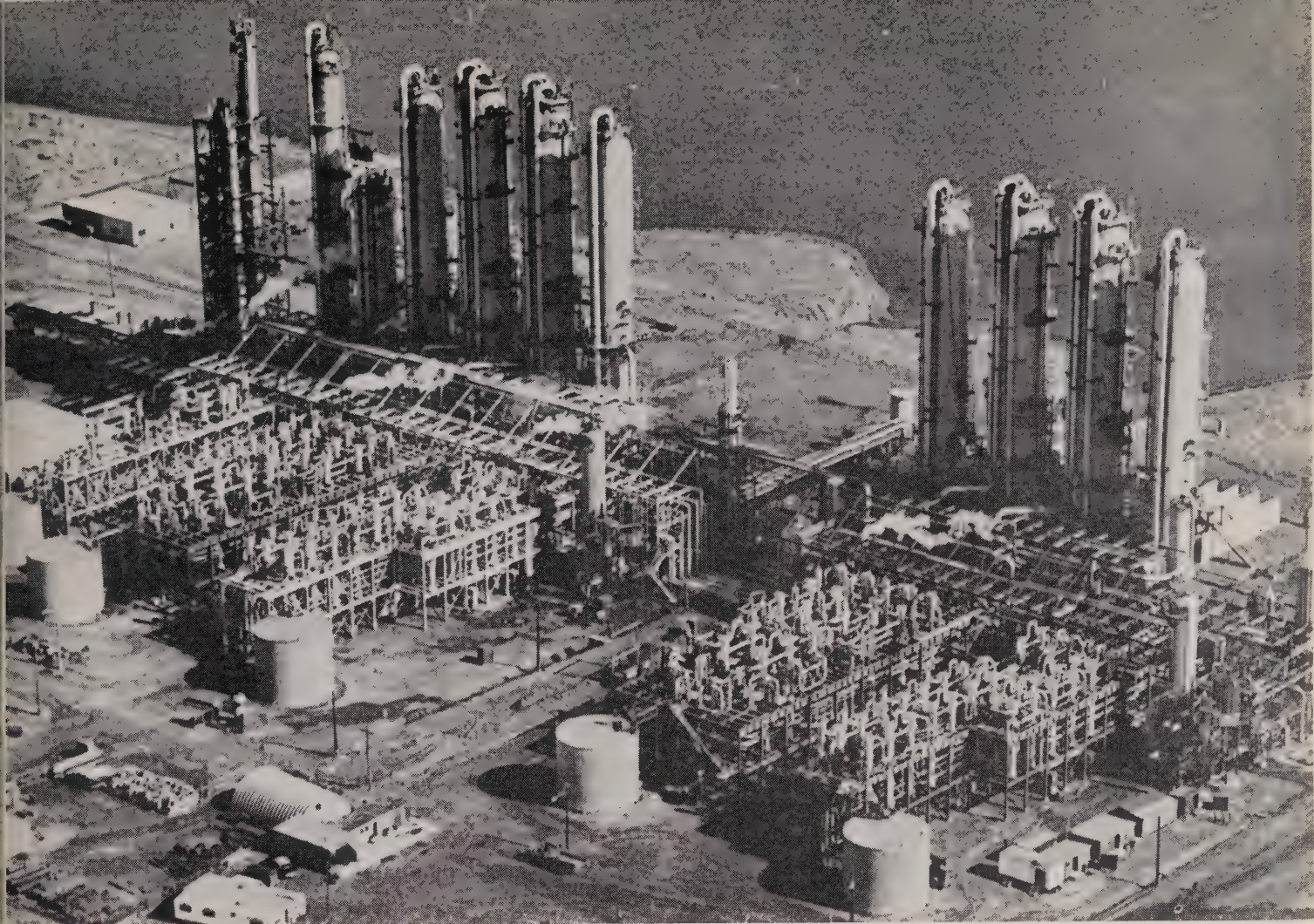
Canadian nuclear stations use deuterium

oxide as a moderator for the neutrons ejected from uranium fuel rods. Without this moderator, the neutrons would move too quickly to sustain the nuclear reaction. There would be no heat to remove, no steam to drive the turbines and no electricity to meet the burgeoning demands of consumers.

The quest for the deuterium in heavy water kept two scientists working day and night in 1931, excited the imaginations of physicists throughout the 1930s and has held the attention of hundreds of chemical engineers and nuclear scientists ever since.

The Columbia University lecturer who discovered deuterium wasn't even concerned with nuclear fission. All Dr. Harold C. Urey, who won the Nobel Prize for his feat, wanted to do was demonstrate that hydrogen gas, the lightest element known, was more complex than chemists thought. Although they were ready to accept that many, if not most, of the elements in nature existed in more than one form — as iso-





types of identical chemical characteristics but of slightly different mass or weight – most scientists had ruled out an isotope of hydrogen.

At Columbia, Dr. Urey and a co-worker, George Murphy, spotted a discrepancy in previous measurements of the weight of hydrogen. It was, indeed, possible that a hydrogen isotope of mass 2 instead of 1 had occurred, although as only one part in several thousand. Working around the clock through the months of autumn, the two first became convinced on Thanksgiving Day that they had heavy hydrogen in the gas they had liquefied.

Later, the discoverer wrote: “My wife was a scientific widow during those months. I am quite sure that Murphy made no progress in wooing his wife-to-be during the same time.”

Once the isotope had been separated and identified, the task became one of naming the reclus. There was some agitation among British scientists for the name “diplogen” to act as a mate to hydrogen.

But Dr. Urey had picked deuterium and the consensus bowed to his wish.

Distilling liquid hydrogen at ultralow temperatures, as the discoverer did, is deemed an impractical method of separating the hydrogen isotopes today. Fortunately, though, there are other alternatives – in fact, over 100 methods that take advantage of the difference in weights have been evaluated.

The Norwegians were the first to make heavy water or  $D_2O$  commercially because Norsk Hydro in the 1930s was already electrolyzing water for its hydrogen content. The extraction of deuterium was primarily a matter of contacting the hydrogen with steam and capitalizing on the fact that the isotope is more sluggish than hydrogen in combining with the oxygen in water.

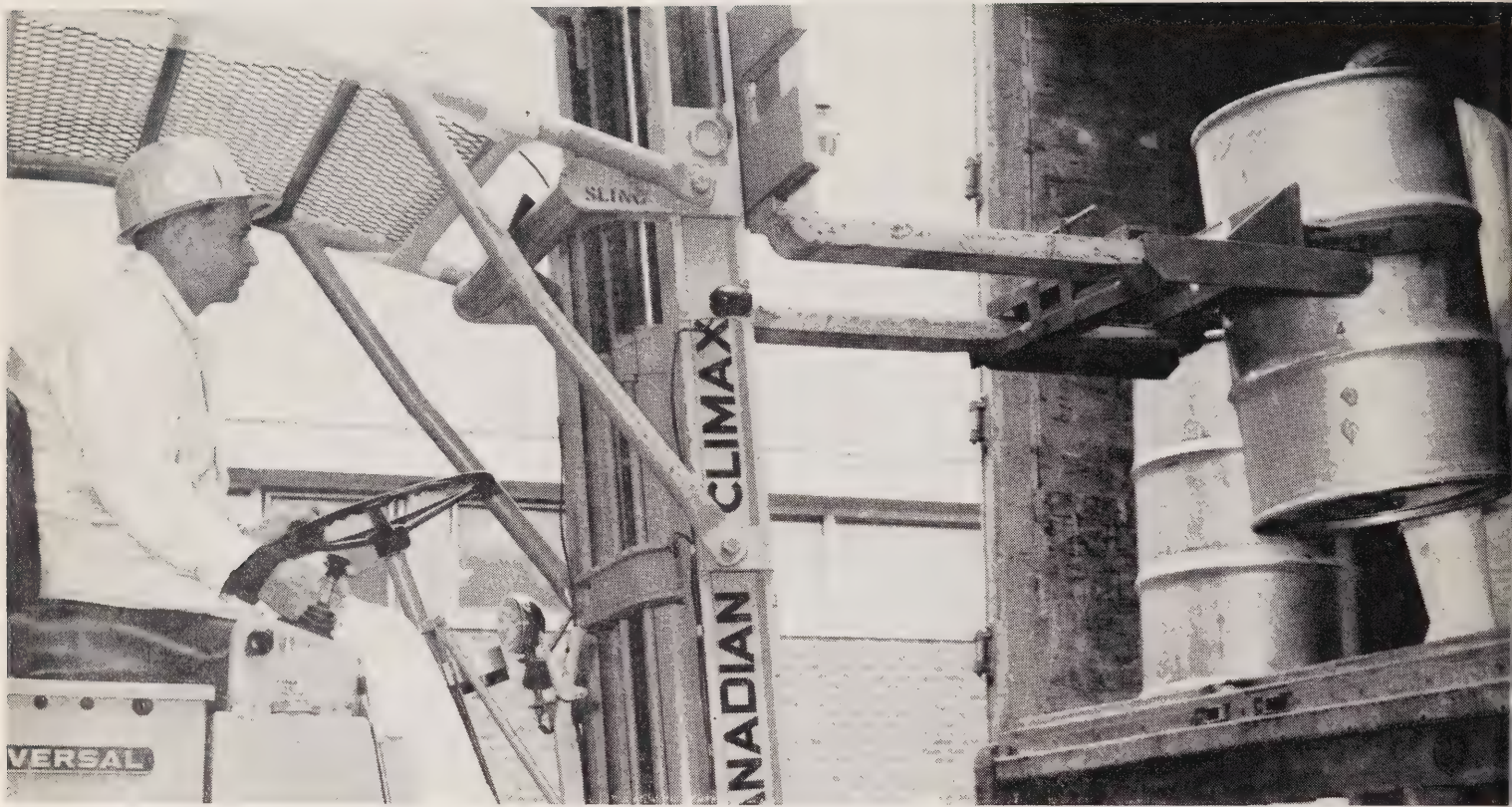
The Rjukan plant made only 1.7 tons of heavy water annually, but that was enough

to satisfy the university scientists who wanted to inject deuterium gas into particle accelerators. Each used so little that \$50 a pound was not an intolerable price to pay.

Things changed in 1939 with the discovery of nuclear fission. And the German occupation of Norway made the Rjukan plant a high priority target for Allied bombers during the war. Indeed, some top level meetings of military strategists and scientific advisers in London had the cornering of whatever heavy water inventory existed in Europe on their agenda. It was no accident that among the most prized possessions spirited out of Dunkirk were drums of heavy water from the Curie radium laboratory in Paris.

Though the Manhattan bomb project was able to proceed without having to make additional heavy water (the Americans used the less efficient but more plentiful graphite as moderator in their plutonium-producing nuclear reactors), the British and refugee French scientists saw merit





in developing a heavy water reactor as a second string to the Allied plutonium-bomb bow.

Canada supplied the location – Chalk River – and the United States promised the heavy water. But when Washington cast about for an electrolytic hydrogen plant as a source of deuterium, it found that the safest and cheapest was also in Canada. So it was that Trail, BC., was for many years the site of North America's sole heavy water plant.

At Chalk River a group of engineers considered but rejected the more straightforward approach of water distillation. Though there was a worthwhile separation factor in the method – the heavier deuterated water molecule escapes from the liquid surface at a slower rate than ordinary water – the energy input was too great if the per pound cost was to be less than \$25 or \$30.

Jerome Spevack, a New York engineer who studied and worked under Dr. Urey at Columbia, proposed another route. He noticed that the separation factors when water was contacted with a second hydrogen compound varied with the temperature at which the chemical exchange took place. Why not utilize that difference to segregate the deuterium?

Hydrogen sulphide, better known as the gas emitted by rotten eggs, worked best with water and so the dual-temperature  $H_2S/H_2O$  exchange process was born. The United States Atomic Energy Commission found it more convenient to call it the GS process, thereby recognizing the Girdler Corporation, which built the prototype plant, and the inventor.

Full-scale plants were built at Dana, Ohio, and Savannah River, S.C., at a cost of more than \$300 million. In 1954, the USAEC offered heavy water at \$28 a pound, a price low enough to put the cost of moderating and cooling natural uranium reactors within economic bounds.

The GS process has its drawbacks. The sulphide gas is extremely corrosive and the energy demand substantial. The plant at Glace Bay, Nova Scotia, has been delayed almost two years by the corrosion problem among other factors. But the process has yet to be displaced, and is constantly being improved.

In Mazingarbe, France, a small plant uses hydrogen from an ammonia plant as the deuterium source for another chemical exchange system, but the deuterium oxide output is limited by the amount of hydrogen that can usefully be generated for eventual conversion to ammonia-based fertilizers. But engineers haven't given up on the idea. Fertilizer plants are growing larger and oil refineries are also finding greater outlets for hydrogen. At several Canadian laboratories, engineering details of the process are being investigated in the belief that the oil and chemical



industries can profitably extract whatever deuterium there is in their hydrogen streams.

One of the main attractions of Cape Breton as the site for Canada's first heavy water plants was that the ocean in that part of the world possesses a high deuterium content. Through evaporation and precipitation, the isotope finds its way into the area's freshwater streams. This was a disappointment for Prairie communities which had hoped to attract the manufacturers with promises of low-cost fuel like strip-mined lignite or other low-grade coal.

However, it is even more practical to locate heavy water plants where the isotopic concentrations are naturally high and where steam and power can be economically generated. The Nova Scotia Power Commission built its Seaboard generating station at Glace Bay to meet the second condition. Another spot in Canada meets these conditions even better.

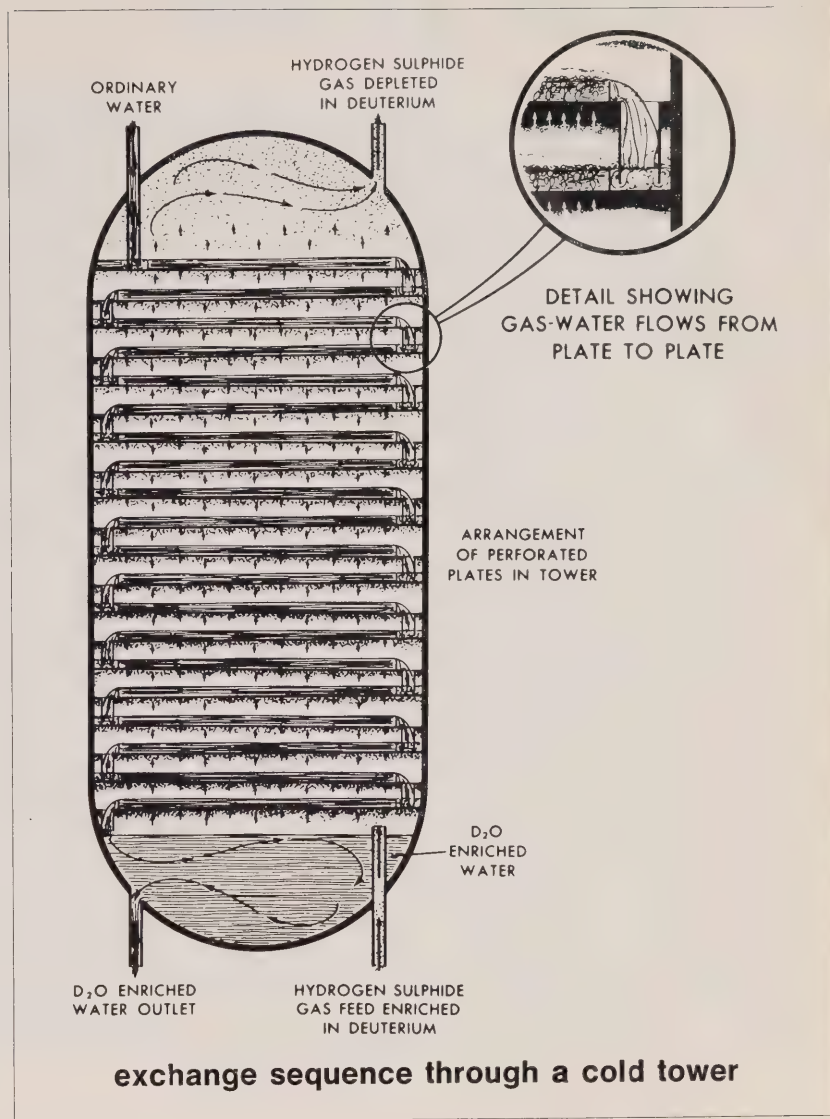
The deuterium content in the Great Lakes system is comparable to that in the freshwater streams of Cape Breton. And the ultimate in low-cost steam is that from a nuclear reactor using natural uranium.

By 1972, half the steam from the existing Douglas Point station will be diverted to the GS-process plant next door. High-pressure steam will be available at even lower cost when the 3,000,000-kilowatt nuclear station is ready in 1976.

Where will it all end?

Nuclear experts here in Canada see heavy water nuclear stations making substantial gains in the rough-and-tumble competition among reactor vendors for many decades to come. By 1980, heavy water plants with a 400-ton annual output may look like small potatoes. Instead of making a \$65 million investment to get into the heavy water business, it may take two or three times that amount.

And if the fantastic power of the thermonuclear reaction — caused by the fusion of heavy hydrogen with other atoms — could be tamed, the role of deuterium would supplant that of uranium. By that time, Canada may well be the world's most experienced hand in the heavy water business. □

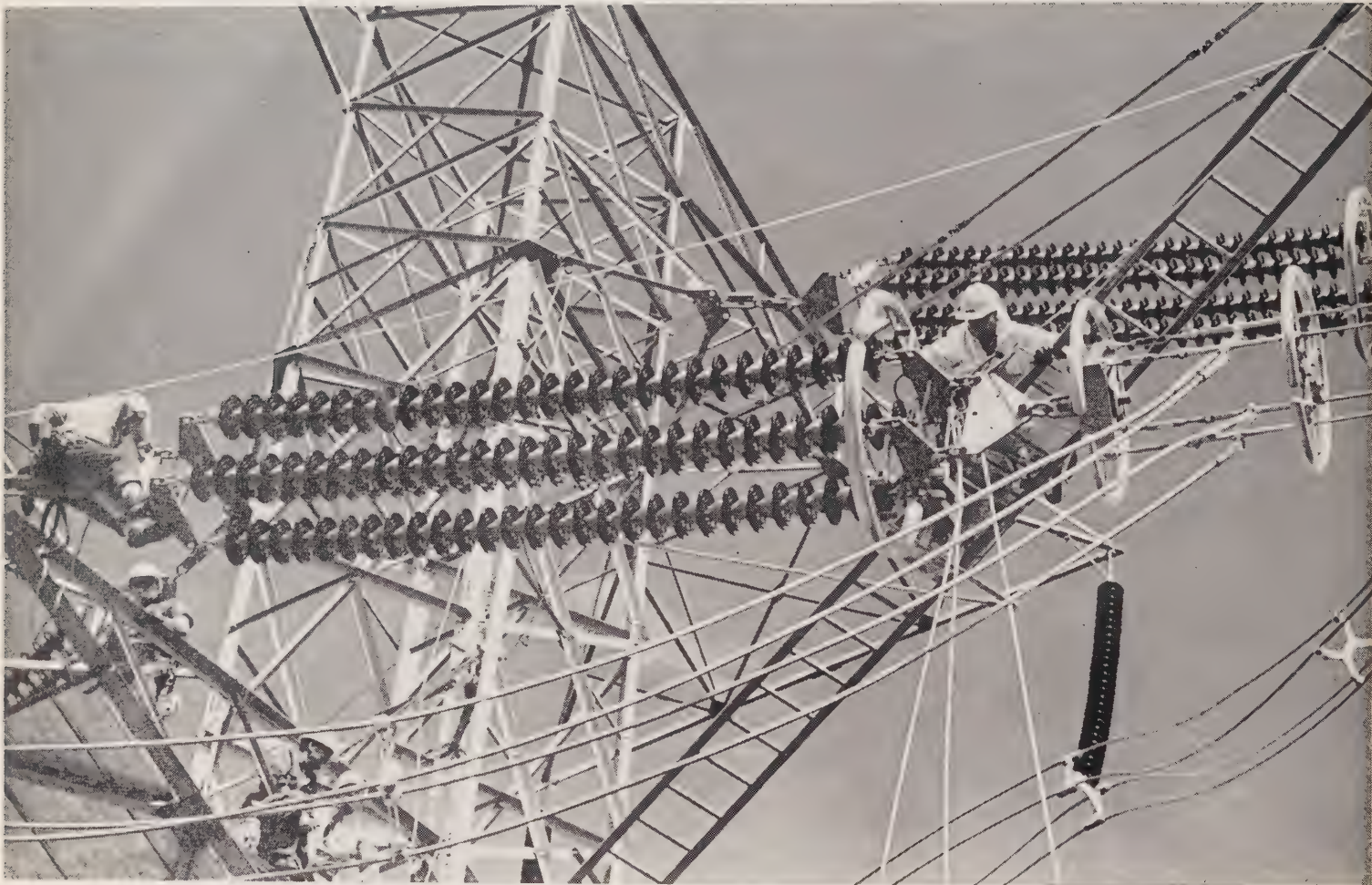


## the GS process

Heavy water is extracted from ordinary water in a series of hot and cold separation towers. Hydrogen sulphide gas is enriched with deuterium atoms after coming into contact with ordinary water in a hot tower operating at 265 degrees fahrenheit. The enriched gas is then bubbled through water flowing down a cold tower. Extra deuterium atoms are transferred into the water in the process. The operation is repeated until the desired level of enrichment is attained.



# efficiency is their line



Two small children were playing outside a Port Colborne home last year when one of them innocently pushed the button on the automatic garage door. The heavy door started to descend, pinning one of the youngsters, a five-year-old girl, face down on the garage floor.

The child was quickly freed by her mother and another woman, but she had stopped breathing and was turning blue in the face. The women's cries for help were answered by Port Colborne Hydro linemen Charles Danford and Frank Onda, who were working nearby.

Danford, a husky 21-year-old with three years' experience in linework, knelt down and rhythmically began to administer resuscitation. In less than half a minute, the child let out a gasp and began to

breathe again. She was rushed to hospital and later released, completely recovered.

For the linemen, who were subsequently commended for their action, it was hardly a typical afternoon. But it's highly unlikely the child would have survived had Charles Danford and Frank Onda not been trained to take emergency situations in their stride.

They belong, in fact, to a relatively select band of individuals whose job it is to work long, often uncomfortable, hours in close company with anything up to 500,000 volts. More often than not, their task is routine. Yet one clumsy movement or a moment's carelessness may herald the fierce splutter of high-voltage that can

leave a man slumped in his safety harness, his clothing afire, on top of some utility pole.

Because of the diversity of jobs they may be asked to perform, estimates of the number of linemen in the province are hazy. With a small utility, the lineman may replace defective insulators one day, read meters the next, fix water heaters the day after that. Working for a large utility, he may specialize in sophisticated "hot-line" techniques, like working barehand from insulated bucket trucks. In this he emulates the birds, which can perch on power lines unharmed because they remain at the same electrical potential. Conversely, the growing tendency in cities to bury distribution lines means he may never get his feet off the ground.



*Sophisticated techniques are used to service 500,000-volt lines without turning off the power. Below, trainee linemen play ball to sharpen their climbing skills and a utility crew cleans up after a winter storm.*

Ontario's lineman population is thought to be slightly over 2,000, most of them employed by Ontario Hydro, the municipal utilities and private power companies. A relative handful work for contractors and large industrial concerns. Turnover is small and probably no more than 130 linemen are taken on each year.

But adequate training is essential and the whole concept of lineman instruction at the municipal utility level is currently being overhauled. Of necessity, much of the work is learned on the job although Ontario Hydro has had a formal training program since 1945. The industry-backed Electrical Utilities Safety Association has had formal courses for linemen since 1962, catering mainly for employees of the municipal systems. And now the Association of Municipal Electrical Utilities — representing the management of the utilities — is embarking upon a comprehensive training program of its own.

Two AMEU courses for first-year linemen were held at Ontario Hydro's Conference and Development Centre at Orangeville last year and courses for second-year linemen will be added this year. Third-year men and those in their fourth and final year of training will be able to attend courses planned for 1970 and 1971 respectively.

In one stage, the Ontario Department of Labor offered to establish a provincial advisory committee to supervise lineman training, but the electrical utilities successfully opposed what, in effect, would have been a government-operated apprenticeship scheme.

"We did not feel in our particular industry that this development was desirable,"

says Lloyd Askwith, assistant engineer of Ottawa Hydro and currently president of the AMEU. "We felt that it might lead to a division of authority without an appropriate division of responsibility. Money for the training would ultimately come from the utilities."

Mr. Askwith says the first-year AMEU course includes classroom work on the theory of electricity and training in such



practical jobs as tying in conductors, setting poles and anchors and installing guy wires. "But the first thing to determine is whether a man can climb a pole," he adds. "Some people are both psychologically and physiologically unsuitable for heights and this fact may go undiscovered if, as in some utilities, he is kept on the ground for the first six months."

Harry Flack, manager of the Electrical Utilities Safety Association and a former lineman himself, agrees. "All the men who come here spend 50 per cent of their time learning proper climbing techniques," he says. "It doesn't matter how infrequently a man has to climb, he still has to be competent at it."

EUSA expects to run some courses for the AMEU at its Rexdale training school



this year and will play a leading role in safety instruction as the program develops. The AMEU syllabus will follow the approach taken by Ontario Hydro toward lineman training although more emphasis will be placed on underground distribution and on the lower voltages used on municipal lines.

Ontario Hydro will this year send nearly 300 of its own linemen to Orangeville for intensive instruction. Men in their first, second and third years will spend two weeks at the school; those in their fourth year take a three-week course. As the courses advance, trainees learn to handle progressively higher voltages.





Their time will be almost equally divided between classroom and field work.

Among individual utilities that recognize the importance of training is North York Hydro, which recently took a crew of apprentices and taught them basic climbing and linework on poles erected in the utility's yard.

Acting manager Don White says the course was for men in their first year. It was an attempt to save tyro climbers from the ribbing they often receive from experienced crews and also to instill good work habits from the start.

"It's always embarrassing for a new man who can't climb as well as the others,

especially if he slips down a pole and gets a sliver in his belly," says Mr. White.

"We gave this novice crew any jobs we had on dead lines. It worked out quite well and we'll probably continue to give apprentices a bit of instruction before they join a regular crew."

What qualities does a utility look for when it hires a lineman? Ideally, he'll be between 18 and 24, about 5 ft. 10 in. tall and weigh around 170 pounds. He'll have at least a grade 10 education, probably grade 12.

"It's difficult to promote a lineman with limited education," says Mr. Askwith. "And you get problems if he has to be taken off the job for reasons of health or age. Quite frankly, I haven't seen that

many linemen retire. Most of them move into supervisory jobs or maintenance work before then."

Of course, while the nature of the job has changed little in 60 years, the mechanical equipment now available has extended the lineman's working life by five to 10 years. Hydraulic lifting devices and pneumatic tools have taken a great deal of sweat and toil out of the work.

Teamwork is all important in the line crew. Linemen often work in pairs with one man acting mainly as observer to ensure that his buddy doesn't make any errors that could lead to a fatal shock. A new man's capabilities and maturity are quickly sized-up by his workmates.

"In many respects, a lineman's job is self-supervising," says Mr. Flack. "A careless person is rapidly weeded out by the men themselves."

Partly because of this and partly due to the rigorous attention paid to safety the accident rate among linemen is low compared to other industries. The frequency of compensable electrical accident is only five or six per million man hours worked.

Right from the early days of electrical transmission, Ontario's utilities have remained in the forefront of power line technology. Only recently, Peterborough Utilities Commission manager Howard Powell and chief engineer William Tait toured electrical systems in Virginia and North Carolina.

They went on a fact-finding mission, but the facts that emerged were that Ontario utilities are very often far ahead of their American counterparts. "It was a disappointment to discover that the utilities we visited did not have as sophisticated a system as Peterborough," Mr. Powell said later.

An efficient and well-trained army of linemen can help to keep it that way — right across the province. □



# The extraordinary cult of do-it-yourself

by Paul Chisholm



## Summer cottages supplant ark among modern-day noahs

Business suits are doffed for dungarees at the end of the working day and brief cases discarded for band saws. Green thumbs pruned in the growing season are bruised and splintered in the following months . . . and many a housewife again bemoans workshop widowhood.

Hobby, mystique or just plain maintenance, do-it-yourself — a multi-million dollar activity in Ontario — regains momentum in the fall and maintains full-throttle throughout the winter.

(With origins dating back at least to Noah of ark-building fame), not until early after

the Second World War did do-it-yourself fully catch on in North America. It was a time when houses and labor were short and marriages plentiful. And homeowners had little choice but to tackle their own projects.

Lumber yards geared to contractor sales initially served do-it-yourselfers as a weekend sideline. But as the cult grew, many companies switched to greater emphasis on the consumer, offering a wide range of building materials and pre-finished fittings and components, fixtures, tools, paints, and other supplies — as well as pre-cut and unfinished lumber.

"Basically, do-it-yourself is maintenance," says Don McPhail, of Beaver Lumber, one of Canada's major building material suppliers. "It's no longer easy to get someone else to do it, particularly at the right price."

Building material suppliers offer the do-it-yourselfer items as varied as bathroom cabinets, eavestroughs, nuts and bolts, swimming pools, panelling, toilet fixtures and patio tiles. Among "package" items, complete with plans and all components, are basic fences, patio decks and sauna baths which the homeowner can fashion according to whim or pocket book.

Beaver Lumber, with 82 of its 280 branches in Ontario, publishes a 120-page illustrated



*Do-it-yourself is booming, all the way from the wonderland of the local lumber store to the sanctuary of the home workshop.*



catalogue that is circulated to more than 1,500,000 homeowners across Canada.

From the catalogue's pages, it is possible to select all the components for a luxury home. It also offers complete homes of two to four bedrooms and a variety of farm buildings . . . all of which, the publication says, "you can build yourself if you have the time and knowhow."

Portable electric tools play an important role in the world of do-it-yourself, enabling home and cottage owners to tackle major projects otherwise beyond the scope of most hobbyists.

The most versatile power tool is undoubtedly the drill, developed to include such refinements as trigger speed control and reverse drive. With the proper attachments, it will drive and remove screws, tighten

nuts and bolts, sand wood and metal surfaces, stir paint, sharpen mower blades and tools, remove paint and varnishes, and is used for polishing and buffing. It also drills holes . . . in glass, masonry, tile, wood, plastics, and metal.

The portable power saw was first developed in the 1920s for cutting sugar cane in the U.S. deep south. But early crude models proved no match for the tough cane. It took an enthusiastic merchandiser-builder, however, to foresee the electric hand saw's potential for cutting wood, not cane.

Improvements, new attachments and new models continue to broaden the scope of electric power tools. Saws come in a variety of types — bench, band, jig, recipro

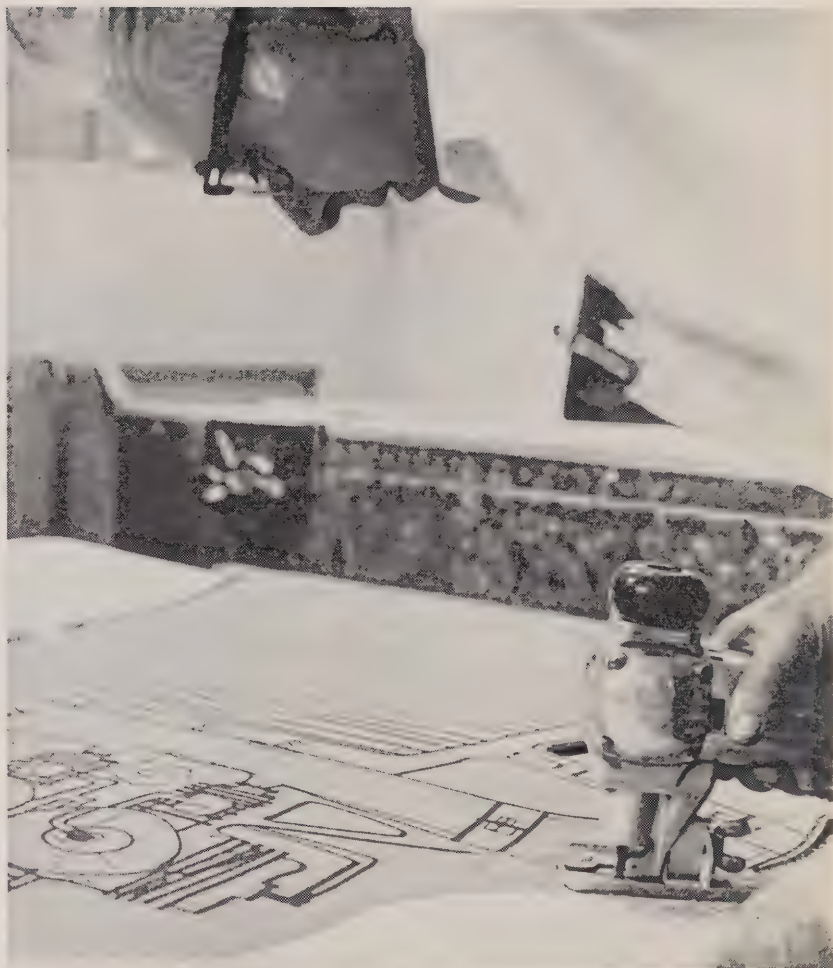
and chain — to name just a few. And all have countless model variations.

Saw attachments permit such tasks as cutting mouldings and grooves while routers enable even the novice to do such professional jobs as making drawers and doors, shaping decorative edges on furniture and cutting grooves and rabbets for cabinet work.

Sanders and planers are also widely used by hobbyists. Only the favored few, however, boast screw drivers, drill presses, bench jointers, wrenches, metal shears and rotating hammers — all commonplace power tools in industry.

As do-it-yourselfers and cottage owners, Ontarians are world champion users of power tools, according to Massachusetts-born Douglas Hart, general manager of





Skil Corp. (Canada) Ltd., one of Canada's major power tool manufacturers. Says Mr. Hart, who has worked in the power tool business in Europe and the US: "At home, in the Boston area, out of 10 neighbors or friends perhaps one or two might have summer cottages. Here it's amazing... out of 10 acquaintances at least seven or eight will have cottages."

Both skilled tradesmen and the hobbyist want convenience, says Mr. Hart. Power tools generally are lightweight and portable... and the future will see more emphasis on portability, with smaller but more powerful motors.

Particularly suited to boat-owners are drills with re-chargeable batteries that clip to the user's belt. The use of such materials as

aluminum and plastics in power tools adds much to their lightness and portability.

And like the energy that drives them, portable power tools are one of the few commodities to counter the spiral of rising prices. Low priced drills, for instance, retailed around \$39 in 1952. Today they sell for as little as \$14.

To further increase the safety of portable electric power tools — and in some cases to protect the hobbyist from himself — double insulation or, alternatively, third-wire grounding of all power tools became mandatory in new Canadian Standards Association specifications a year ago. Although third-wire grounding of some portable power tools and appliances has been recognized for years, it was only in 1968 that CSA specifications for grounding

or, alternatively, double insulation were extended to the entire range of devices.

Double, or reinforced, insulation as it is sometimes known, incorporates a second layer of protection inside the tool interposed at every metal-to-metal contact and every gap narrow enough to be jumped by electric current. It makes all power tools so equipped safe to operate in any receptacle, indoors or out.

Safe, easy-to-operate electric power tools not only ease the burden of the do-it-yourselfer but increase his capabilities and raise workmanship standards.

Why, then, wait for spring... □





Symbolizing a decade of marketing and the decade ahead, this 10 plus 10 motif was the theme of an Ontario Hydro marketing conference that ranged in its scope from water heating to railroad electrification and computer programs. Summarized here are three of the keynote speeches.

## picking up the gauntlet

The theme of the conference was brought home by Don Ramsay, director of sales, in an opening address entitled "The Challenge of 1969".

"Challenge could mean many things to many people," he said. "I would take the point of view of the fellow with a chip on his shoulder and see if by inviting you as either an individual or as a member of a group to 'pick up the gauntlet' might lead to not only tangible rewards, but the inner satisfaction of a job well done."

Looking into the crystal ball, Mr. Ramsay predicted that business activity would accelerate moderately through 1969. A rate of eight per cent was predicted for capital spending growth, but he doubted that a similar growth in consumer spending would follow. He said that heavier income tax, inflation and other increased taxes would dictate less discretionary spending this year.

"It is expected that new housing construction in 1969 (both single and multiple) will increase only nominally over 1968, maybe some five per cent. In other words, the fuel battle in new housing will continue, especially in the steadily declining single home market," said the director.

He challenged delegates to bring electric space heating up to 25 per cent of the market.

He pointed out that by 1978, large industrial-type farms will account for over 95 per cent of the produce grown. "The small farm will disappear in the next 10 years and the medium-size farm will be well on its way out."

Calling for continued co-operation from all areas of Hydro, Mr. Ramsay noted that it was "possible and practical" to secure 45 per cent of all new and conversion poultry installations as all-electric in 1969.

Mr Ramsay said that changes in educa-



Don Ramsay

tion in the province — the drastic reduction in the number of school boards — would require major shifts in the approach to this market. He said that in the next decade the seven or eight-month school period would give way to a full 12-month curriculum and "air-conditioned accommodation for the summer months would seem to be a natural.

"Sales personnel do not operate in a vacuum, nor can they expect to meet a challenge by themselves. They require co-operation and assistance from a great number of people and organizations within and outside Ontario Hydro," said Mr. Ramsay.

He then issued challenges to other divisions of Hydro such as treasury, accounting, law and research. He added that they all had been very helpful during the first 10 years of marketing.

The director invited his listeners to "join an exclusive club which has no entrance fee, no executive. The only provision is that each member must believe there is a challenge in 1969, and be prepared to give that second effort to meet it." □

## the fourth dimension

There is a fourth dimension in employee-management relationships that transcends the familiar dimensions of time, work and dollars, Ontario Hydro General Manager Dr. J. M. Hambley told delegates.

"The fourth dimension I refer to is employee motivation," he said. "You can be pretty sure, though, that you haven't begun to appreciate its effect upon behavior as long as you only correlate it with even the best scales for measuring what a man does, how long it takes him to do it, and what you are going to pay him for doing it.

"What we have to do is identify the employee's motivation — I call it 'isness' — with our business," he added.

Although technological advancement had not eliminated our need for food shelter and personal survival, said Dr. Hambley, it had enabled us to provide them to the extent that they were now of minimal importance as motivating factors.

"Today an applicant for a position wants to be able to identify himself with the aims and objectives of his employer. He asks for more than a job, more than a regular pay cheque. He wants a sense of purpose and a sense of personal achievement.

"Employees still need money and security, but we err if we concentrate too narrowly on money and security as motivating forces."

Investigations had shown that achievement in the job was one of the highest motivational factors, said the general manager. If this was true, it must be related to a goal that would be a source of pride to





J. M. Hambley

employee.  
Dr. Hambley concluded: "We are no longer in business only to sell a service. In a society of continuous and rapid change, we must be out developing the market, assessing and guiding the next appropriate development in the demand for electric energy."

"When we are motivated by this approach, we shall get our feet off the brakes and on to the accelerators." □

## the need to market

Speaking on the subject "How's the focus?" D. J. Gordon, assistant general manager — marketing, concentrated on whether there was a need to market. "This question is still being raised, even after 10 years of marketing at Hydro," he said.

"Some people think of Hydro as a

monopoly, so why promote?" Mr. Gordon asked. "While it is true that the basic economics of large utility systems such as Hydro virtually gives us a monopoly in the supply of electricity, those of us who have the responsibility of increasing sales volume know just how severe competition is in the energy market. The monopoly connotation is a myth today."

"The fact that we have been operating with a very slim system capacity reserve also prompts people to ask why we need to promote. Obviously we must look at the long-term advantages."

Mr. Gordon quoted a letter from Hydro Chairman George Gathercole to the municipalities last year. The letter said in part: "Our marketing program will be aimed at utilizing our generating resources to the optimum advantage 24 hours a day the year round in an attempt to maintain the cost of power at a low level. In addition, we must have regard for the huge, long-range expansion program we have under way and be constantly in a position to utilize fully this capacity as it comes into service."

"People also ask why promote when Hydro has to meet its load growth by higher cost thermal generation," Mr. Gordon continued. "These people overlook the fact that, even prior to the time natural gas competition hit us, our long-term load growth rate of some 6½ per cent had already pushed us into the thermal business."

"Furthermore, it is not realistic to place all the blame for higher costs on thermal generation. While the cost of generating power from thermal plants, either coal-fired or nuclear, is higher than the average cost of generating power from our hydro-electric resources of the 'good old days', we would be faced with a cost differential even if we had large blocks of hydraulic power to be developed in Ontario today, as in the case of Quebec and Manitoba,



D. J. Gordon

because of the higher cost of money, the higher cost of labor, the higher cost of equipment, materials, etc."

Mr. Gordon said that electric utilities today must be marketing-oriented, and must never forget that the only reason they are in business is "for the customer". Hydro could not isolate itself from the retail operation and assume the strict production-oriented role of a power wholesaler.

"We operate an extensive rural retail system, and we share with the municipalities a responsibility to make known to all existing and potential customers the many advantages available from the use of electricity."

"We must give everybody an opportunity to use electricity and encourage them to use it, provided they are prepared to pay the lowest possible price at which we can make it available," he added. □



# along hydro lines

## February meeting

A record attendance from all sections of the electrical industry is expected for the Ontario Electrical League's ninth annual conference at Toronto's Inn-on-the-Park on February 10 and 11. Between 1,200 and 1,500 architects, consulting engineers, designers, electrical manufacturers, distributors, and contractors will be following the theme, "OEL - In Step with the Future."

W. L. Scott, OEL manager, says: "The format of the conference will be completely different from other years. The emphasis will be on a workshop type of meeting with several concurrent sessions on the second day. Exhibits will be more numerous than ever, with 50 manufacturers participating."

The conference will launch National Electrical Week in Ontario.

## Switch over

East York Hydro is now serving all the citizens in the borough. It happened with the stroke of the new year, when Toronto Hydro turned over responsibility for serving people in the former Town of Leaside to the East York utility.

Under Bill 81, which took effect in Centennial year, Metropolitan Toronto was re-organized into six municipalities from 13, with Leaside being annexed to the Township of East York to form the Borough of East York. Electrical service had been provided to Leaside by Toronto Hydro under an agreement which dated back to 1929. Purchase price for the distribution lines and other associated equipment amounted to about \$1.4 million. Some 8,000 customers were involved in the transfer.

To mark the occasion, East York Hydro held a three-part ceremony on the last day of 1968. There was a luncheon which



*Et voila . . .*

featured a cake-cutting by Mayor True Davidson, the unveiling of a plaque at a Leaside substation and the handing over of a cheque to Toronto Hydro. Chairman Jack Christie is shown unveiling the plaque while Miss Davidson and Commissioner Charlie Ellerbeck look on.

## Engineer retires

E. F. (Ells) Burbank, engineer in charge of distribution construction at Toronto Hydro, has retired. To mark his 45 years of service, a banquet was held at the Sutton Place Hotel with more than 100 from the utility, Ontario Hydro, the AMEU and the OMEA attending.

Mr. Burbank was active in the AMEU throughout his Hydro career and served as its president in 1966. A graduate of Queen's University, he joined the system distribution department in 1923. In 1949, when he became street lighting engineer, he persuaded a manufacturer to produce a light fixture made of plastic. It cut



*Retiring in a haze of smoke*

the city's breakage of lights from 20,000 a year to almost none and won two national plastics awards.

At the banquet, Mr. Burbank, left, was presented with a mantle radio by Harry Hyde, general manager. A veteran pipe smoker, he also received one of the street light globes filled with tobacco and matches.

## municipal briefs

**Tara Hydro** topped off its first 50 years with a banquet. The guest speaker, Ontario Hydro commissioner Lt. Col. A. A. Kennedy of nearby Owen Sound, outlined the progress of the last half century in Bruce County. A film tracing the story of electricity from the laboratories of the 1860s to its present indispensable role was also shown.

**Dan Beattie** has been appointed assistant manager and secretary-treasurer of the Ontario Electrical League. He succeeds Harry Foy, who is retiring next month. Mr. Beattie, who has been with Ontario Hydro for 29 years, moved from the post of residential sales supervisor for Central Region.

**Donald K. White** has been appointed acting general manager of North York Hydro. He succeeds James B. Gray, who held the position for 20 years and is retiring early. Mr. White, an engineering graduate of Queen's University, started with North York Hydro in 1952 as assistant to the superintendent. Seven years later he moved to the post of assistant manager-engineering. He worked for Ontario Hydro before joining North York. The new manager is a district director of the AMEU.

**Three** can live cheaper than one according to a report presented to the public utilities of Galt, Hespeler and Preston, which merged



an association in October. The report, from a consulting firm, dealt with water storage facilities and indicated that about 100,000 can be saved by the triple approach.

**Hugh Township** citizens left no doubt about it when they voted 2,903 to 966 in favor of having a three-man Hydro commission elected to administer their electric service. Three years ago they voted to purchase the system from Ontario Hydro and, while this was accomplished in 1968, another by-law had to be approved to establish the commission.

**Winding down** a total of 50 years' service to Chatham Hydro took Chairman and a general manager to do the job. On the receiving end of the presentations were Wilfred Cartier, of the repair department, and Jack Jamieson, of sales. They got their quarterly pins from Chairman Guy Morrison and General Manager S. Reynolds.

**Railway crossing** accident has taken the life of one Guelph Hydro employee and seriously injured another. The two men, Roy Rawson, operations superintendent, and his assistant, Ross Ayles, had just left the utility when their vehicle was in collision with a freight train at a crossing at Speedvale Avenue and Edinburgh Road. Mr. Rawson died five days later from head and chest injuries. Mr. Ayles, who suffered similar injuries, is expected to be back on the job in the spring.

**Miriam Savage**, after 37 years of "counselling and advice," has retired from Marmora Hydro. Miss Savage, who was secretary-treasurer of the commission and is still clerk of the village council, was presented with an inscribed silver tray at a banquet honoring her service.

**Forty-six years** of service to Georgetown ended recently with the sudden death of Mayor Joseph Gibbons. Mr. Gibbons first entered municipal politics in 1931 when he successfully ran for a council seat. Three years later he became mayor, remaining in that office for 10 years. After a brief retirement, he returned as a councillor then as mayor. He served as assessment commissioner for 14 years and again returned to the mayor's chair. He was in his 18th term when he died. As mayor he was a member of the Hydro commission and had planned to attend a commission meeting the night of his death.

**Now you see it, now you don't** — in Harrow, at least. A wrecking team, given 45 days by Harrow Hydro to remove an old landmark from the site of its new building, took less than a week to do the job. Construction of the office will start this spring. Meantime, the commission has made a shrewd public relations move by offering public parking on the empty lot.

**Ingersoll PUC** customers are now receiving computerized accounts although the utility doesn't have one piece of electronic hardware. Actually, it's all thanks to co-operation between the Ingersoll and London PUCs. Clerks in Ingersoll prepare cards from meter readings and send them to London for processing. V. MacLachlan, Ingersoll PUC manager, says the system has cut billing time from 2½ weeks to one week. The cards take only an hour to run through the London computer and are returned the next day. □

## Staff under study

Staff training, both inside and outside the realm of municipal utilities, came under the microscope at an AMEU administrators' training conference in Toronto last month.

Frank Blake, of Bell Canada's traffic department, told delegates about his company's problems in training operators. He said that training is never finished. Girls are given an initial two-week course, but undergo supplementary training from time to time.

"Too much training can sometimes become sickening and you can lose staff," he warned. Supervisors must use their judgment in this area.

Delegates also heard from D. G. McLaren, of Woods, Gordon

and Company, about work studies of inside staff. He said that "white collar" workers have been growing in number since 1951 and that by 1980 they will outnumber "blue collar" people.

Indicative of the importance of training was the absence of the next scheduled speaker, A. L. Furanna, of London PUC. He was involved in a computer course and was unable to tell the 60 delegates about utility staff training. Instead, AMEU president F. L. G. Askwith outlined the association's role in training.

The keynote speaker, Dr. Herb True, from South Bend, Indiana, told the administrators that change is the essence of the 1960s. He said there was a "change or be changed" atmosphere. Dr. True described the younger generation and how they differed from his audience. These were the employees of today and tomorrow and he said administrators would have to adjust to their new attitudes and standards.

R. A. McDougall, a vice-president of the Bank of Montreal, spoke of the cashless society of the future. The evolution of the computer had been dramatic, he said. "In the spring of 1961, a unit of work on a computer took 40 hours and cost \$4,000. By the fall of that year it took only two hours and cost \$200. Today it would take 15 minutes and cost even less."

He foresaw the day when people would carry a master bank account card, which would be fed into a machine when purchases were made and the customer's bank account debited. No cash would change hands, not even a cheque would be written.

"Even further in the future, it's possible that a utility will simply send meter readings to the bank where they'll be processed and the customers' accounts debited," said Mr. McDougall. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

When first elected to a utility commission, a person may spend several weeks discovering facts and philosophies of which he was unaware. During this period, the new commissioner is much like the average customer, since he has only seen the utility from the public's point of view. And the experience will later help him to appreciate the misunderstandings that can develop between a utility and the public.

The OMEA-AMEU public relations committee provides material that will help to bridge the credibility gap between utility and customer. This month, for example, a series of seven newspaper advertisements are being mailed to every utility office. With modification at the local level, they can help to tell the story of local utility service to the community. Each advertisement portrays a different feature of utility life in the community.

\* \* \*

A rate increase is an unpopular announcement at best, but there is no need for it to be confusing. In an effort to communicate its latest rate change, Woodstock PUC prepared pamphlets for each of its various groups of customers. Although the design and introductory message were the same, the inside page announced and explained only the new rate for the group to which that customer belonged whether it was residential, all-electric, power, or general service. Woodstock utility reports an improvement in customer understanding compared with its last rate increase.

\* \* \*

On a more sociable note, Goderich PUC recently held its fourth annual dinner for employees, town council, electrical contractors, and their respective wives. The program, interspersed with brief speeches, long service presentations, and entertainment, featured a colored slide show illustrating utility progress during 1968.



Such an annual dinner provides the utility commissioners with an opportunity to express their appreciation to those on whom they depend for service and co-operation.

\* \* \*

In East York, Hydro chairman Jack Christie has been "telling the people" with a weekly column in the local newspaper. He started in January last year and hasn't missed a week since, despite a visit to hospital in May and summer holidays in August. Called "Speaking of Hydro in East York", his column is an excellent example of commission-customer communications.

Items like plans for a new utility building or a running commentary on East York's acquisition of service to the former town of Leaside are mixed with such topics as an abstract discussion on the derivation of the word "Hydro". Timely comments on current subjects are a convincing way of getting the utility's point of view across to its customers.

Storm damage, safety in the community, the amount of taxes paid by the local utility — all have been covered at appropriate times. Even kindred subjects such as an explanation of the OMEA and the AMEU, or relations between Hydro and council were described to the readers. Housewife interest is maintained with helpful hints and tasty recipes which usually complete the column.

Does it have any effect? Columnist-commissioner Christie reports many telephone calls from appreciative customers. There may be many other utilities who would like to borrow his recipe for good communications.

\* \* \*

Getting across the message can even involve the local barber — at least that's a theory being expounded in Waterloo, Iowa, where councillors are cultivating relations with the clip-and-snip brigade. The idea is that if civic affairs are going to be bandied around the barber's chair, it's best to have the barber on your side. It's an unusual notion, but any utility adopting it will certainly get a head start in the communications business.

## Underground gets an airing

A symposium set up to study the conversion of electrical circuits from overhead to underground drew more than 200 experts from the municipal utilities to Mississauga's Huron Park Centre last month.

Welcoming delegates on behalf of the sponsoring utility, Hydro Mississauga chairman W. E. Wright said there appeared to be no guidelines in either Canada or the United States on converting residential overhead systems to underground.

"In view of the increasing use of underground in new subdivisions, which in some municipalities is mandatory, and the resulting public interest, it is important that commissioners be prepared for this development," he added.

Papers on underground projects in their respective municipalities were given by Rudy Senyshen, Kitchener, and John Torrance, Etobicoke, while M. D. Henderson, Mississauga, and John Dunn, North York, looked at some of the financial problems related to underground construction.

Mr. Henderson said that underground circuits should be classed as a luxury because of the difficulties in municipal financing.

"Just to provide funds for what has normally been considered the provision of necessary services such as water, sanitary sewers, storm sewers, roads and hydro is becoming increasingly difficult. In the town of Mississauga, for example, it has only been in the last few years that we have been able to provide funds for community facilities such as arenas, libraries and swimming pools and there are still several of these facilities required before I believe we can look at including conversion to underground circuits as part of a properly planned program."

Mr. Dunn said that from the consumer's point of view, the



*Subterranean rumbles*

question of underground or overhead must be examined from the standpoints of safety, reliability, cost and appearance. "I am told that to convert North York's overhead system to underground would cost at least \$100 million," he said. "I suggest that from the safety aspect we need to look at the total environment. If we had \$100 million to spend on safety, would we spend it on underground?"

Mr. Dunn added that there was no such thing as a completely reliable system. Underground distribution would eliminate the untidy look of overhead wires, but he questioned the customer's eagerness for underground supply if, for example, hydro rates were doubled to pay for the conversion.

The meeting later broke into four study groups to consider policy, timing, financing and the actual methods of converting to underground. All groups agreed on the desirability of underground systems but expressed doubts as to costs and methods of financing. These factors will likely be considered at a future meeting.

Shown examining a display board at the symposium are Mr. Dunn, A. G. Stacey, manager of Guelph Hydro, and R. V. Moogk, manager of Listowel PUC.

## Take eight for safety

Eight safety seminars — one more than last year — will be held across the province in 1969 by the Electrical Utilities Safety Association. Apart from displays of the latest safety equipment available to the electrical industry, the seminars will cover such topics as ladder safety, precautions to be taken in work areas to safeguard the public and line crews and safety as related to new overhead construction concepts and aerial devices.

Meetings will be held at New Liskeard on Feb. 21; Sudbury, Feb. 25; Ste. Marie, Feb. 27; Sudbury, Feb. 27; Kitchener, March 10 and 11; Chatham, March 13 and 14; Smiths Falls, March 18 and 19; Toronto, March 24 and 25 and Port Arthur on April 24.

## November energy production

Primary energy provided by Ontario Hydro in November totalled 4.99 billion kilowatt-hours, an increase of 7.6 per cent over the same month a year ago. For the first 11 months of 1968, the total is 50.36 billion kilowatt-hours, up 8.4 per cent over the same period last year.

Adjusted for seasonal influences, primary energy demand in November was 4.82 billion kilowatt-hours, 1.4 per cent more than the previous month. The seasonally adjusted total for November represents 57.89 billion kilowatt-hours at annual rates. This is 416.12 per cent of the energy demand in 1949.





## is don wright sees it

having disposed of this year's bumper crop of solutions with unprecedented dispatch, we are ready free of the grumpy twitchiness which tends abstinence and which has been prolonged on some past occasions right up to the middle of January. Consequently, we are prepared to outline the past with a steady hand and to affix the future with a contemplative eye.

And to those who would say nay to the steady and contemplative eye on the grounds that the future has already been reviewed and forestalled beyond all endurance, we can only sympathize and suggest that they stick around. Most of our pundits have been unable to separate the heat from the chaff in the matter of significant events and if we can strip the husks from some of the really meaningful kernels of achievement, it behooves our readers to remain for the corn.

If for nothing else, 1968 will be remembered as the year of the big flood—a paper deluge emanating from government committees and study groups and dealing with subjects ranging from the language we'll speak to labor procedures and education. And in many cases, much of the meat has been buried under the potatoes.

Take the far-ranging Smith report on taxes. Opposition did arise, of course, but for the most part it was directed against the more innocent aspects of the report such as those which would slap taxes on colleges, hospitals, food and children's clothing. Others took umbrage at the proposals to soak us for the luxury items we use such as electricity, telephones and undertakers' services.

Few spotted the real sleeper—a veritable rattle-snake quiescent in an unobtrusive subsection but ready to upset the entire social structure of the province at the bobbing of an adam's apple. Disguised by verbal camouflage, this clause has only one interpretation—to eliminate the price advantage of 26 cents on a 24-bottle carton of beer, which Southern Ontario residents presently enjoy, and establish uniform rates across the province.

Let them tinker with our taxes if they must, but let's put first things first and not try to bury them under a flood of trivia. Allowed to stand, the beer clause wipes out any remaining reason for abiding south of Kapuskasing and could trigger such a northern movement of people as to make the radical migration of the leemings look like a

one-mouse affair.

■ US foreign policy continued to draw criticism during 1968 and there were accusations of waffling in a number of important areas including Vietnam, foreign aid and international trade. As usual, governmental successes were largely overlooked.

One flagrant example was the news media's concerted attempt to ignore Washington's strong and effective stand on the matter of peanut butter. After two-and-a-half years of public hearings at which no group or individual was denied a voice, the government proclaimed unequivocally that no spread containing less than 90 per cent peanuts shall henceforth be designated as peanut butter.

This is extremely reassuring to many of us who look south of the border for leadership and it's to be hoped our own legislators will be equally firm. They might even take the lead in this instance and establish a commission to investigate the whole jam-banana-peanut butter relationship which seems to be coming to a head as more and more of these mixtures make their appearance on supermarket shelves.

■ Advances on the scientific front were multitudinous during the year and it would be presumptuous to name a particular development as the most significant. The Apollo moon shot ranks high among the commentators for year-end honors and some give the Russians the nod for their imaginative scheme to improve our weather by pumping out the Arctic basin.

Nice work, boys, but we'll cast our vote for the work being done by that team of French doctors in the field of body odor. Their preliminary findings hit like a bombshell just as the year came to its conclusion—directly contradicted general opinion. They claimed, in a nutshell, that people who bathe frequently smell worse than people who do not.

Whether or not their conclusions are particularly significant remains to be seen, but these men get our nod on three counts—originality, devotion to the cause and ingenuity. Prior to this breakthrough, BO had pretty well been abandoned from the standpoint of scientific investigation on the grounds that it could not be measured in precise terms of quality or intensity.

Unfortunately, little has been revealed relative to the instrumentation developed for these experiments. Speculation is that the French president himself lent his facilities. Certainly, they are adequate.

■ Honorable mentions in the electronics field would have to include that new machine under study by the American Medical Association which is reported to have cured a blackeye in as little as 20 minutes; a computerized automatic bartender able to program up to 1,000 mixed drinks; and the conversion of the world's oldest profession to scientific methods.

The latter got its start in San Francisco where ladies of the evening are now using VHF walkie-talkies in conjunction with radio-equipped cars to facilitate customer contact.

■ Pollution abatement programs gained new urgency during the year as some of the lesser known evils attending our sloppy external house-keeping procedures were exposed.

Virgin sturgeon are a case in point. As the

result of pollution in the Volga River and Caspian Sea, the sturgeon population is dwindling rapidly. So serious is the situation that the prized eggs are only available to Soviet citizens on the eves of holidays—at \$9.50 a pound.

The rationale for the sturgeon's behavior is perhaps to be found in a report by a University of Pennsylvania researcher which claims that pollution is changing the taste and odor of air and water to such an extent that animals are losing their eating and mating instincts.

These are pretty important instincts no matter how you look at it, and if the thesis is correct there is no room for complacency on the part of the species homo sapiens.

This point was brought home by a medical spokesman for a group of dissident Mississauga residents at a gathering to fight expansion of the Toronto International Airport. He blamed noise levels and pollutants from aircraft for causing everything from mental disorders to beri-beri. Side effects included allergies, stomach aches, headaches, heart trouble, fatigue, suicide and sexual impotence.

And so it goes—the frustrating round of progress and recession which is the story of our society. On the one hand we can report encouraging technological advances on the part of our oldest profession. On the other, we must relate disturbing environmental changes which could deprive that same profession of most of its customers.

■ Things were relatively peaceful on the municipal front except for Woodstock where feelings ran high for a while on the subject of a million-gallon cow tank. Put forward as a means of advertising Oxford County's main industry, the cow-shaped water tank suggestion was reluctantly shelved in favor of a more conventional reservoir on the grounds that it was impractical. And there were uglier reasons.

■ Hydro's splendid reputation for continuity of electrical service was maintained in 1968, but there were the usual crop of esoteric outages. One of the more unusual was perpetrated in the Northwestern Region by an owl. Less wise than otherwise, this particular bird, in full flight, chose to divest himself of a well-processed meal in the vicinity of a high-voltage power line.

Being none too selective in the choice of its conductors, electricity flashed up the path of least resistance, jolting the owl severely in the vicinity of its tail feathers and causing a momentary interruption in the 115,000-volt line. Spectators report that the bird appeared to suffer no lasting ill effects and recovered its flight pattern before hitting the ground.

■ Electrical consumers in the province can look forward to another year of growth in per capita use of their favorite form of energy, but they will be well advised to check their volts and ohms with more than usual care. Commencing January 1, the value of the volt was decreased by eight parts in a million. This was partly offset by an increase in the value of the ohm by three parts in a million. In all, 10 countries including Canada converted to international standards in this respect. The new values are not expected to influence buying patterns significantly although some careful shoppers may swing from volts to ohms. □





**Follow the leader?** Well, hardly. Driven by a high-velocity jet of water, the Ontario Hydro boat homes along a laser beam during a survey of the Niagara River below the falls. Soundings were needed for research into the preservation and enhancement of the American Falls. Hydro was asked to do the job because it had used the technique several times to speed underwater survey work. By employing engineering innovations like this, Ontario's electrical rates have been kept among the world's lowest. Electric power costs about the same today as it did 10 years ago. And there aren't many bargains around like that.



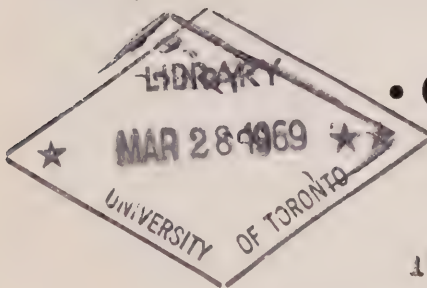
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- behind the footlights
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# ontario hydro news

february/1969



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## bargaining for principles

Anyone in the province who has escaped reference to the strike being employed by labor against Ontario Hydro must have been singularly well insulated against all the media of mass communication. Details of the few items in dispute have been on the public tongue since the strike began and their importance and implications balanced and measured.

This is to be expected as it is these direct issues which will determine the outcome of a situation which involves a vital public service and affects virtually every person in Ontario. But it may not be possible to assess the over-all picture without some understanding of developments which have tended to change the historic relationship of the two parties to the dispute.

Hydro's involvement in labor relations commenced in 1935 when it granted voluntary recognition to its employees under the Employee Representation Plan. Through a series of mutations it emerged as the Ontario Hydro Employees' Union – Local 1000 of the Canadian Union of Public Employees.

The largest and most successful group in this union, the OHEU continues to be regarded as a self-serving body within CUPE. But this seems to be changing.

In the light of its pre-eminent position in an ambitious and active union dedicated to growth in an area so full of potential as public service, Local 1000 can only be regarded as a guiding star. Is it unreasonable to ask if the local is now shifting its emphasis from exclusive concern with the welfare of Hydro employees to the common weal of organized labor?

If so, its total identification with the national labor movement would, of course, require the local to accept labor's political aspirations as its own – thus ending the independence it has enjoyed as an autonomous unit.

No matter how the dispute is resolved, the unique position the local enjoys in the union must be taken into consideration in assessing the position of the two parties at the bargaining table. What are the broader issues at stake?

By avoiding any serious interruption of power in achieving its aims through a rotating strike, the union would establish an alternative to arbitration by a neutral third party. More important, total success would serve better than all the rhetoric at its command in convincing other service institution employees of where their welfare lies. As the pace-setter, Local 1000 is not likely to confine its demands to those issues of immediate concern to its membership but can hold out for economic principles and outside objectives.

Even so, would Hydro not be well advised to accede to union demands and proceed unhampered with the job of supplying power? There are two basic reasons why the Commission cannot take the easy way out. Both relate to its responsibilities to the power users of the province.

A rotating strike is essentially an attempt by labor to pre-empt management authority. But the Commission is appointed by the government of Ontario to develop and maintain the power system. If it is to be held responsible, it cannot delegate its right to manage to anyone else.

Secondly, Hydro must exercise some control over matters affecting the cost of power. It can and does provide its employees with wages, benefits and working conditions which are among the best in the province. It has no right to go beyond this and ask its customers to finance union aggrandizement. □

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### the cover

Canadian sculptor Gerald Gladstone used transparent cubes to create this striking piece which stands in the foyer of Macdonald Block, part of the Ontario government's new offices at Queen's Park. The work is shown in its entirety on page 13. Photo: Ron Brown.

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# cool clear water

by Hal O'Neil

It's defined as a colorless, transparent, odorless compound of oxygen and hydrogen in liquid state, convertible by heat to steam and by cold to ice. And to one-third of the utility commissions in Ontario, it's as vital as kilowatts.

The liquid, of course, is water and it is important to the commissions because they are responsible for acquiring and distributing it around their municipality. Utilities involved with water service range in size from a place like Southamptton, with a population of 1,800, to London, with 100 times that number.

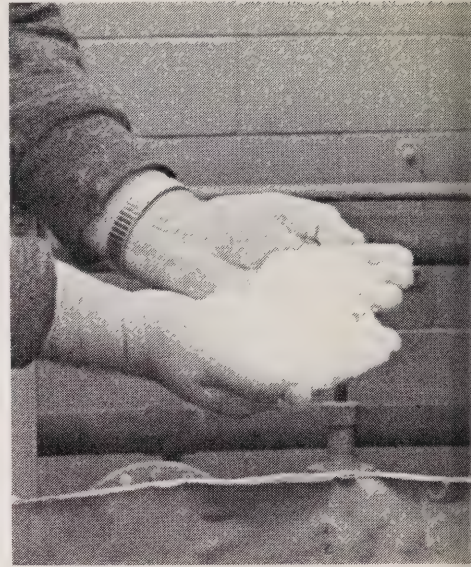
Electrical service may be more glamorous, but the treatment and transportation of water dates back to the earliest civilizations. The ancient Chinese and Egyptians used chemical coagulants to purify their water — probably the first form of treatment — and the Romans built huge aqueducts to transport water to cities from distant sources. Only the very wealthy could afford to have water piped into their homes; the plebeians were provided with public baths and fountains.

At the beginning of the 17th century, steam pumps were installed in both Paris and London. Paris was first, lifting water from the Seine, while London boasted the first municipal reservoirs in 1609. Two centuries went by before modern water treatment began with the development of a slow sand filter by James Simpson in England. Later in the 19th century, scientists like Lister and Pasteur discovered that drinking water could carry such deadly





photos by Keith Dugdale



diseases as typhoid fever and cholera. The miracle of present-day purification evolved from there.

Southampton PUC is the first utility in the province to employ a diatomaceous earth pressure-filtration system using water from the Great Lakes. The filtration material comes from deposits at Lompoc, California and is made up of the skeletons of tiny unicellular algae. It is white and powdery looking much like flour.

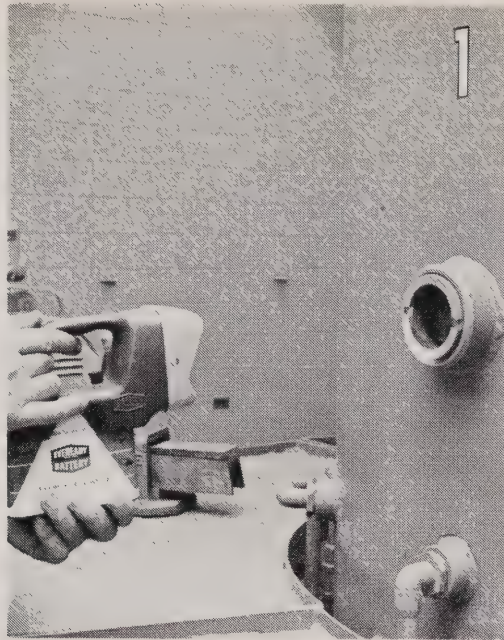
The original water supply for the town was developed in 1905. The system consisted of chlorinating raw water pumped from Lake Huron; however, demands for more and better water grew and the PUC took steps to develop a new source of supply.

Preliminary studies indicated filtration was the only form of treatment required. At the same time, intake locations were surveyed and a site selected about two miles from the centre of Southampton. Diatomaceous earth filters were tested at the old pumping station and proved ideal.

At the new plant, raw water flows by gravity from the lake along a 24-inch, 1,100-foot intake to a well beneath the building. A coarse-mesh screen keeps fish sticks and other objects out of the well. Pumps draw the water up, forcing it through twin filters and then to a water tower for delivery to the town.

The filtration system can treat 700 gallons a minute. Inside, star-shaped elements are covered with a synthetic-fibre sheathing which supports the diatomaceous earth. As water is forced through the sheathing,





*Southampton PUC manager Glen Manley prepares diatomaceous earth and filters for insertion into the water filtration tanks. Small ports facilitate periodic inspection. Although the town is relatively deserted out of season, the water system must be capable of meeting the huge jump in demand when summer visitors flock to the resort.*

fine coating of earth traps minute undesirable particles suspended in the raw water. When the filters get too heavily coated, the system is reversed and treated water passes through at high pressure to wash out the system.

The diatomaceous earth is fed to the filters from a slurry from two 250-gallon tanks. Proportions are adjusted automatically according to the flow of raw water and its turbidity (percentage of suspended particles).

Southampton's water treatment plant automatically runs itself. Only daily checks and a once or twice-a-week loading of diatomaceous earth into the slurry tanks are required. Everything is controlled from electronic panels in the plant. The equipment also records such data as the turbidity of raw and filtered water, station pressure, total pumpage and storage tank level.

Glen Manley, manager of the PUC for over a year, admits he didn't have any water experience when he returned to his home town from Grand Bend PUC. "But I've learned a lot about the plant just through operating it," he says.

One thing, the synthetic sheathing in the filters gets a periodic visit to the local endomat. The washing, complete with backwash, has upped the efficiency of the filters and cut down on the amount of diatomaceous earth used. More frequent

backwashing has also meant lower consumption of the earth.

The saving is important since, in comparison to other filtration methods, operating costs are high. On the other hand, capital costs are lower than with other systems. The project's \$425,000 cost was financed through the Ontario Water Resources Commission.

The OWRC, which was created in 1956, was made responsible for the development, utilization and management of water resources and the provision of adequate pollution control measures across Ontario. It deals with municipalities, industry and even small groups of individuals.

Even a small customer, such as a farmer irrigating his own fields, may have to deal with the commission if his drawing of water affects uses further downstream.

Ontario is richly endowed with volumes of fresh water. About 17 per cent of the province is under water compared to a national figure of 7.6 per cent. Of course, the Great Lakes account for much of this area and, indeed, provide 60 per cent of the province's water supply. A further 20 per cent comes from underground water and the rest from "inland" surface water.

But the use of water is constantly on the rise. In early civilizations, three to five gallons a day for each person for drinking, preparing food and washing would provide a minimum level of comfort. Today, the average Canadian household uses from 20 to 70 gallons a day for each person

Extensive lawn and garden sprinkling and automatic washing machines help to boost demands.

The relationship between standard of living and water consumption is illustrated in the United States, where some 1,400 gallons are used each day for every man, woman and child. Less than 10 per cent of this amount is used by individuals in their households. The greater part is consumed by industry and agriculture — with the demands for irrigation slightly exceeding those of industry.

Like electrical service, water supplies must be geared to peak demands — no median of service can be struck as with other utilities, such as the telephone. As an example, on an average day the two million people in Metropolitan Toronto require about 225 million gallons. But on a hot summer's day, the demand can balloon to nearly 400 million gallons.

Southampton, despite its size, suffers similar problems. Being a resort town, the population soars from fewer than 2,000 in the winter to a high of 15,000 in the summer. Thus in January, about 4 million gallons are pumped by the station while in July the figure jumps to nearly 30 million.

Electric pumps are universally used in the water business. And the fact that an almost unlimited supply is taken for granted is due in no small part to the economy and reliability of the power that keeps our cool, clear water on its uphill course. □



# Stealing The Limelight



*Small switchboard controls the entire lighting at York University's Burton Auditorium.*

by Lois Lane

The theatre, dramatists claim, is a mirror held up to life for all of us to recognize our foibles. But it would have been a tarnish-murky looking-glass indeed without the evolution of artificial lighting, which has gone all the way from candles to electronics.

In today's sophisticated playhouses, a simple manipulation of a switch allows computer-plotted lights to unfold the pattern of the drama. Yet theatre design has almost turned full circle.

"Present theatre design seems to be reviving the thrust-type stage or theatre-in-the-round," says Nicholas Ayre, stage manager of York University's Burton Auditorium.





the style used by the Ancient Greeks when the first dramas written for large audiences unfolded in Athens in 500 B.C. At those times, the stage manager prayed to the gods of nature to bring sunshine to illuminate his performances. But some witty showmen made their works more spectacular by using glorious sunsets and rising of the moon to produce a new atmosphere.

Based on nature or not, the founders of drama still met the prerequisites of modern theatre lighting. They illuminated the performers, made the sets credible and created, in a crude, dark way, mood.

Historically, the Italians were the people to transplant the stage from its outdoor setting to an indoor environment. But these productions were for the court and no attempt was made to light the stage. Chandeliers glowing with candles provided the first stage lighting, but provided little artistic effect.

With the development of the proscenium-stage, a design allowing the audience to peer into a square cut from a box, lighting could be more easily directed. Some attempt was made to place light around the proscenium and across the

front of the stage. It was not unusual during a performance for a person to walk across the stage in front of the actors, snuffing out a candle wick or trimming a smoking oil lamp.

Perhaps the first major footlighting came in the late 18th century when a trough of oil full of floating corks with blazing wicks illuminated the stage's outer reaches.

During the late 1700s, the projection of color on the stage was tried by shining light through glass containers filled with colored liquid. Indirect lighting was achieved by directing light in front of colored silk.

Gas lighting came to be generally accepted after being introduced into London's Drury Lane theatre in 1818, and had a run of over 25 years in English and European theatres. The incandescent mantel gas light produced an unbearable heat for

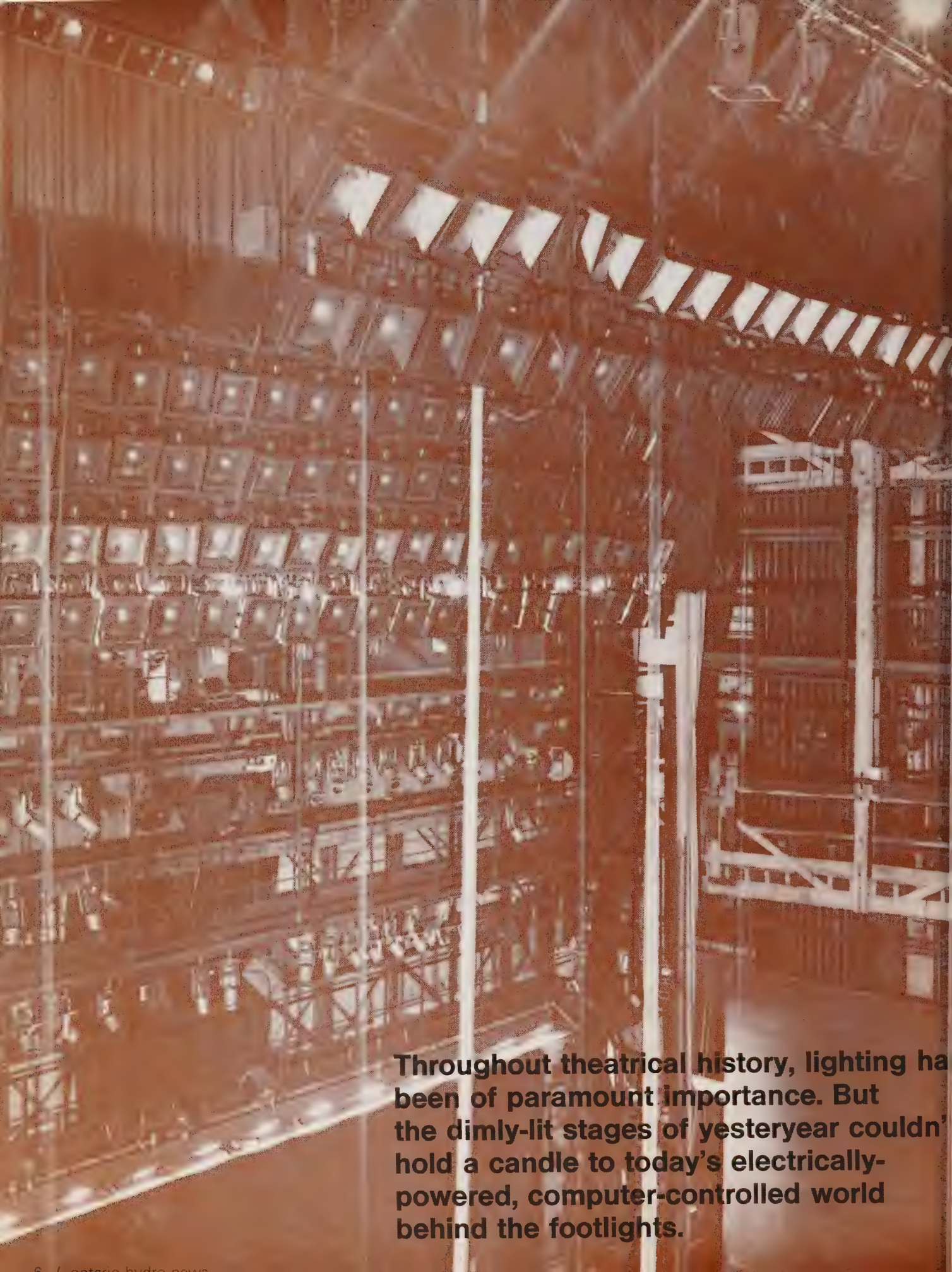
actor and audience alike, and smoke from the lamps gave the playhouse the appearance of an opium den. However, with the advent of gas lighting, light intensity on the stage could be controlled for the first time. Candles and oil lamps produced a glare that gave the actor's face a flat dimensionless appearance.

Associated with the era of gas lighting was limelighting, an illuminator emitting a brilliant white light so excellent for theatrical productions that the name "limelight" became synonymous with the stage.

Developed by Drummond in 1816, the lime or calcium light turned the stage over to scenic artists. It has been described as "at once radiant, yet mellow and by crossing the rays of different lamps and of different tints, strange twilights and soft moonlight effects were produced".

In its early days, limelight was used for realistic beams of the sun, moon or lamp-light, directed through windows or doors. Although the electric arc apparently gave





**Throughout theatrical history, lighting has been of paramount importance. But the dimly-lit stages of yesteryear couldn't hold a candle to today's electrically-powered, computer-controlled world behind the footlights.**



*What the audience never sees — the banks of lights at the Royal Opera House, Covent Garden. Right: thrust-type stage used in Shakespearean drama at Stratford, Ont.*

the earliest lens-equipped spotlight, the lime was also used for spotlighting and, in the 1870s, for front-of-house lighting.

Gas lighting had a long run in the theatre before electricity raised its head in challenge, although the electric arc was used to represent the rising sun at the Paris Opera House in 1846. This arc-light gradually evolved into spot and floodlights in the 1860s. Equipped with the enclosed hood, lens and standard, the arc was the prototype of the modern electric spotlight. Used with a parabolic mirror, it flooded certain portions of the stage intensely . . . but it never superseded the limelight because it was noisy and had an annoying flicker.

Both limes and arcs continued to be used long after the electric light bulb's introduction to the theatre. Like gas, electricity was tried out all over the theatre before finally emerging on stage.

The first public building in London illuminated throughout by the electric bulb was the Savoy Theatre, built by D'Oyly Carte for the Gilbert and Sullivan operas.

The London Times of October 3, 1881, was impressed with electricity's use to light this theatre and reported on the "incandescent lamp" invented by J. W. Swan and worked by an engine of Siemens Bros. and Co. "About 1,200 lights are used, the power to generate a sufficient current for this is obtained from large steam engines giving about 120 horsepower, placed on some open land near the theatre. The new light is not only used in the audience part of the theatre but on the stage for footlights, side and top light. . . . This is the first time it has been attempted to light any public building entirely by electricity. What is being done is an experiment and may succeed or fail."

Succeed it did, but not without criticism. Some felt the auditorium was being lighted at the expense of the stage, and there were complaints about glare. Shortly after this "experiment", dimmers were developed to achieve graduation between full light and total darkness.

By the end of the 1890s, most of the important theatres in Europe, England and



America had electricity installed. One reason for its acceptance was that many theatre fires, and there were a number, had been blamed on gas lighting.

Theatre lighting's story becomes more complicated after the acceptance of electric lighting. Now lights, optics, color and control methods become enmeshed. However, just before World War I lighting was still regarded as primitive, depending on border strips with floodlighting achieved by placing six bulbs together in groups. Shafts of light were produced by carbon arcs.

Optics made its presence felt by the 1920s as projector lamps and better lenses were employed. Much of the optical development came 100 years before with Augustin Fresnel's work on lenses, refractors and prisms . . . all for lighthouses, but which

were slowly adapted to theatre lighting. One of the most important lighting devices in theatres and television studios still bears his name.

With the electric lamp came the gelatine color filter which caused a sensation in the early 1920s as it could change the entire scene, costumes and makeup. Color mixing was achieved by motor-driven dimmers. Then came automatic color mixing, but still employing gelatine filters. Finally, filters of cellulose acetate took over giving a far greater color range.

Controls also became more intricate prior to World War II. Remote control of lighting was introduced to the theatre in 1928 with the invention of the magnetic clutch to drive the dimmers. A few years later, the lighting operator could literally "play" the lights. He would sit at an organ-type console and, by manipulating the stops, would change and direct the lighting pattern.

In present theatre, the same objectives of lighting apply, depending on the structure





director of Ryerson's Video and Television Arts course.

"The lights in a studio are mainly used to outline the performer, to make him stand out from the background, much like a portrait photographer outlines his subject."

It seems nothing is escaping the computer age and this is especially true in the advances in lighting controls. In 1959, the first fully automatic lighting control was demonstrated, employing a punch card to record all lighting changes. On playback, the lighting is repeated exactly as recorded.

It is quite common to install at least 200 dimmers in a theatre or television studio and the latest development in this field is a control system with instant dimmer memory. Hundreds of cues can be recorded magnetically for dimming at exactly the right point in the play. The two largest systems of this type are currently being installed in the National Arts Centre in Ottawa.

Even the humble electric lamp has come a long way since its first introduction to show business. Newest on the market is a quartzline lamp with a tiny coiled filament and pencil-size bulb that provides a pinpoint source for both conventional and new developments in stage lighting.

Ten years from now? William Dale, a lighting designer whose work takes him to New York and Las Vegas, and who annually illuminates the C.N.E. grandstand show, points out that today's developments are mainly improvements of old ideas. "But I think you'll see fewer projections and more projection of scenery on the background."

And for the future, lighting designers may well have a real challenge in store. What with the scenery disappearing from modern productions and with nudity becoming increasingly accepted on stage, there isn't going to be much left except the dialogue and the lights. □

of the playhouse, and the production. Thrust stage theatre like that of Ontario's Stratford Festival or the Burton Auditorium at York University, depends on lighting from many directions, mostly from overhead devices placed at 45-degree angles directed to the stage which thrusts out into the audience. Glare can be a problem here, and on this stage there are few scenic aids, so period or time must depend on costuming.

With the proscenium stage, the lighting comes from two or three directions . . . usually side, overhead and from the front of the house.

Experts agree that good theatre lighting should be three-dimensional. To cover the

stage and the actors, floodlights are used to provide low intensity color toning of the open stage and the backcloths, while profile spotlights provide a precisely controlled beam of light on the actor. Highlighting is accomplished by Fresnel spotlights. And to give the feeling of movement, such as clouds drifting by or waves, optical effects are projected on the backcloth.

"However, television lighting is two-dimensional," explains Syd Perlmutter,



# regional government holds the stage

regional government was the pervading theme of the District 4 OMEA meeting held last month in Toronto. More than 100 commissioners representing utilities in Metro and neighboring municipalities were on hand to hear the latest thinking in a rapidly developing concept which is bound to affect the municipal distributors of electricity.

OMEA president J. R. Philips, Brockville, told delegates that the Ontario government has accepted the principle of regional government and will move toward implementation as rapidly as possible. In referring to a brief presented by the association to Municipal Affairs Minister Darcy McKeough a few days prior to the District meeting, Mr. Philips said this action had been taken without reference to the general membership in view of the urgency of the situation.

He reminded delegates that the decision to study the implications of regional government had been made at the annual meeting of the parent association of the OMEA last February and that the statement of policy contained in the brief had been drawn up for presentation at this year's annual meeting, to be held March 3-5. He assured delegates that the whole matter could be presented to the membership at large at this time. "However, because of the recent definite pronouncements by the government and other indications of urgency," Mr. Philips explained, "it was the considered opinion of your augmented government Legislative Committee that there was urgency in placing this policy before the Minister of Municipal Affairs immediately as we are determined to prevent elimination of commissions by turning the operation of local utilities back to councils.

"As most of you know," he continued, this meeting was held January 9 and our brief to the minister stressed, firstly, the importance of retaining commissions, secondly that they be elected, and thirdly that

if there was more than one tier of regional government, the commission be at the top policy-making level."

A resolution later put before the meeting by Hydro Mississauga asked that the OMEA adopt a policy of favoring just the opposite — Hydro at the lower level. It was accepted by the delegates for further study by the district executive.

The statement of policy contained in the brief says:

"The Ontario Municipal Electric Association hereby declares that, with the exception of Metropolitan Toronto because of its unique position and size, it would be in the best interests of the users of electrical energy in the province of Ontario that the total retail sale of electrical energy in each of the regions of Ontario, as and when the same are established by the provincial government, be under the jurisdiction of a hydro-electric commission elected by the residents of that region; and, further, that within the regions, the function of The Hydro-Electric Power Commission of Ontario should be generally reserved to the generation of electricity and its delivery to regional commissions at transmission voltage."

Regional government was also among the issues discussed by guest speaker Allan E. Reuter, MPP for Waterloo South. He told the District 4 meeting that, in his opinion, the greatest weakness of the local Hydro operation was the wide variety of functions performed by utilities other than the provision of electricity. He felt some of these functions would be taken away under regional government.

Mr. Reuter, a member of the Ontario select committee on municipal affairs, said that the committee had found PUCs providing such services as water, telephone systems, transportation, personnel, police, streets, gas, parking, public service, sewers, garbage, fire, parks, sanitation, property and welfare.

"I believe that all public utilities com-

missions should base their operations on the provision of electricity to our people," he said, "and that all other functions should be carefully examined to determine if a regional or local council could do the job as well or better."

At the same time, the speaker cautioned against "attempting to find strength at the risk of destroying something that is already strong".

Despite the need for changes in municipal governments, Mr. Reuter believed that the distribution of electricity would continue to be handled by local commissions "as one of the most successful enterprises of its kind in the entire world".

Ontario Hydro Chairman George Gathercole told delegates that peak demand reached nearly 10 million kilowatts in 1968. He said it took 48 years to reach the 5 million-kilowatt level. Now, that growth has been duplicated in the span of a single decade. On the basis of present forecasts, demand was expected to surpass 20 million kilowatts by 1979.

The Hydro Chairman said it was a tribute to the engineering and operating staffs that every major thermal unit on the system was either operating or ready at the time of the annual peak, December 16, with the sole exception of unit 5 at Lakeview. It also produced power later that evening.

"Hindsight might suggest that my cautionary letter to you would have been better left unwritten," Mr. Gathercole said in reference to a letter sent to the utilities late last year explaining the critical power situation. "But this is not a point of view I share. I felt then and do now that, as our partners, the municipal utilities should be informed of the difficult situation we might have to face."

He outlined some of the "close shaves" Hydro had experienced in the weeks leading up to the peak.

"November 28 was the Thanksgiving Day holiday in the United States," he said, "and as things turned out we had





*Newly-elected officers for OMEA District 4: Seated, Elmer Archdekin, Brampton, president; Ontario Hydro Chairman George Gathercole, honorary president; Edmund Steer, Ajax, 1st vice-president. Standing, John MacBeth, Etobicoke; John Christie, East York; Donald Glass, Aurora, past president; M. W. Broley, Scarborough; W. E. Wright, Mississauga; M. J. Damp, Toronto, secretary-treasurer.*



*OMEA president J. R. Philips, second from right, presented cuff links for 25 years' service to A. W. Hollingshead, of Woodbridge, and 15-year certificates to J. V. Fry, of Markham, and John McMechan, of Toronto.*

reason to be thankful." Sudden forced outages of equipment combined with other problems to create a shortage in excess of a million kilowatts. Because of the American holiday, Hydro was able to purchase 550,000 kilowatts over the interconnections and meet all primary requirements.

Another "squeaker" occurred December 9, the chairman recounted. Only a last-minute offer of 200,000 kilowatts from an inter-connected American system averted power cuts. Hydro had been able to supply this same system with a similar sized block of power last summer during its peak period caused by the air-conditioning load.

Barring a large-scale breakdown in generation, Mr. Gathercole predicted that Hydro would be able to meet demands during the next six critical weeks, but he cautioned that all resources and equipment would be needed.

Mr. Gathercole went on to explain why Hydro must persist in a strong but carefully oriented marketing program even though this might at first appear inconsistent with the tight power situation prevailing at the moment. In the light of the gigantic building program under way, which is essential to meet consumer requirements and provide adequate reserves in the future, Hydro must maintain a sensible policy of building load after a pattern designed to promote the fullest possible use of equipment.

He said that lower costs and economies of scale offered some help in the battle against inflation. At the same time, he cautioned that Hydro had no magic formula by which it could insulate itself from the world of rising costs.

Other features of the busy District agenda included panel discussions on cable TV and on the Co-operative Marketing Plan for Essex County (Compec) involving 12 municipal utilities serving some 35,000 customers. With respect to the latter, it was predicted that the Metropolitan area would be surrounded with similar marketing co-operatives within the next few years.

### **An open mind, says McKeough**

Ontario Minister of Municipal Affairs, W. Darcy McKeough, told delegates to the District 4 meeting that the provincial go-



ment does not yet have a specific policy for the future role of hydro-electric commissions in its system of regional government. "Our minds are completely open on this question," he said.

Expressing interest in the brief on regional government submitted by the OMEA executive, the minister stressed the need for flexibility in any arrangement for Hydro administration in new regions. He said: "It is important to recognize that conditions may vary throughout Ontario, so we may not end up with a uniform system across the province. Local desires will probably play a major role in determining the final structure to be used for retail hydro sales."

He also referred to the recommendation in the OMEA brief that the elected utility commission in each region take over responsibility for all retail distribution of electricity, including rural, thereby giving about 540,000 customers now served by Ontario Hydro "a voice in the control of their electrical utility for the first time".

Mr. McKeough said it had always been assumed that citizens in the rural areas served by Ontario Hydro were represented by their members of the provincial legislature, who were always willing to take up any electrical service problems with Ontario Hydro.

The 35-year-old cabinet minister repeated the suggestion he had made to the OMEA executive at the time the brief was presented, that the association examine the regional organization in Ottawa-Carleton, which came into being January 1, and the proposals made for reorganization in Lincoln and Welland counties.

"It is my hope that, after studying these two regions, your association will be able to come to me with a proposal for the reorganization of hydro commissions for these two areas. If a workable plan is produced," he said, "it could form the pattern for other regional governments throughout the province."

Speaking more generally, Mr. McKeough said the province was planning a new form of municipal government because there had to be a change in the interest of efficiency. He said: "A municipal structure created in 1849 for a horse-and-buggy society is hopelessly inadequate for this age of space travel.

"We have chosen regional government as the method that makes sense — the method that is both more efficient than the present system and also, very importantly, more effective in the interests of the way of living of our people."

He added that guidelines for the size and nature of regional government had been worked out, but details such as whether it would be a centralized single structure, or two-tiered, were still subject to discussion and study.

Ideally, said Mr. McKeough, each region would contain a population of from 150,000 to 200,000. He noted that 90 per cent of Ontario municipalities are smaller in population than the 8,000 figure he has suggested as a minimum size for lower tier units in a two-tier system.

No arbitrary timetable for instituting the system across the province has been established, said the minister. The intent is to concentrate first on those areas where there is the greatest need.

"I would expect the whole procedure, starting from scratch, to take something like two years, and it certainly could take longer in some cases," Mr. McKeough said in assessing the time factor associated with the establishment of regional government in a particular area.

Specific proposals for regional governments have been made for the Halton-Peel, Lincoln-Welland and Lakehead areas. Preliminary studies are under way for Hamilton-Wentworth, Kitchener-Waterloo, Muskoka and Sudbury regions. Proposals are expected in 1969 for areas north and west of Metro Toronto and eventually for Norfolk-Haldimand and Brant County. □

## Apply brakes—delegates

Of eight resolutions which came before the District 4 meeting, two will be passed on for consideration at the parent association's annual meeting in March, four were referred to the district executive and two were voted down.

Approved was a resolution from East York Hydro asking that the OMEA and Ontario Hydro consider the advisability "of slowing expansion to a more manageable rate of load growth" during the present period of high interest charges with a view



*Ontario Municipal Affairs Minister W. Darcy McKeough chats with District 4 outgoing president Donald Glass about the province's regional government program.*

to holding retail rates at existing levels. The tight power situation with the possibility of interruptions in service was pointed out in the preamble as being inconsistent with the intensive sales program being maintained — factors which would mar the Hydro image in Ontario.

Delegates also voted in favor of a resolution from Oakville PUC, asking that the OMEA recognize the occupation of hydro lineman as a trade under the Apprenticeship branch of the Ontario Department of Labor and take action to have it instituted as soon as possible.

Mississauga Hydro sponsored four of the resolutions. One called for a study by District 4 of rates applying to hospitals and similar institutions with a view to combining power and commercial rates. Another asked that consideration be given by the district to establishing a consumer credit rating system between utilities. Both were approved.

Referred to the district executive for further study were two additional Mississauga proposals. One asked the association to promote uniform standards of construction for transformer vaults on consumer premises to reduce costs. The other suggested that the OMEA adopt a policy whereby, in a two-tier regional government scheme, Hydro be administered at the lower level.

Defeated were resolutions dealing with a proposal to transfer street lighting ownership from utility to municipal corporation; and one dealing with the election of OMEA staff to municipal Hydro commissions. □



A sight for sore eyes awaited Ontario government employees when they first moved into their high-rise offices at Queen's Park. Unused to such bright surroundings, some of them literally had to don sunglasses until their eyes adjusted to the new conditions.

Under normal circumstances, however, visitors will never see the well-lit upper floors. They'll transact their business on the ground floor of the two-storey Macdonald Block, the central core building which will ultimately link all four high-rise office towers.

At the moment, the Macdonald Block connects only two high-risers: the 14-storey Ferguson Block on Wellesley Street and the 11-storey Hepburn Block on Grosvenor Street, both located behind the Whitney Block, once known as the East Block, which is the elder statesman of the group.

Construction of the other two — the nine-floor Hearst and the 24-floor Mowat blocks, which front on Bay Street — is delayed for the simple reason that the financial wherewithal is lacking at present. Each building in the complex is named after an ex-premier of the province and, interestingly, three of the five were Liberals.

When completed, the centre will house about 10,000 civil servants and help to centralize government operations in Metro Toronto. However, certain departments, such as Highways for example, will remain in their present locations because there are no good reasons for centralizing them.

How does the government centre compare to the upcoming Ontario Hydro project at the southwest corner of University and College? Hydro's futuristic head office will be located only a short jog away from the government offices.

The smaller, ultra modern, \$28 million Hydro building will complement the generally traditional sweep of the \$58 million Queen's Park complex. Rather than clash with the new government buildings, Hydro's structure will enhance them and present a buffer against taller skyscrapers that may be built in the future by private enterprise.

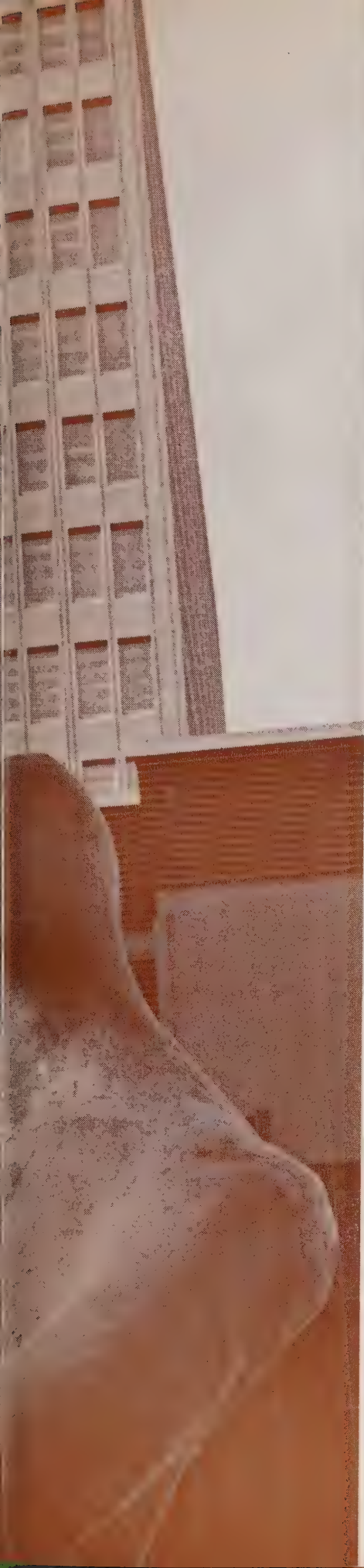
In the meantime, the government centre is filling a housing need that has existed over a number of years. And it embodies many interesting features that boost efficiency for both civil servants and the public.

As a kind of distribution centre, the Macdonald Block contains information desks to help direct the public to appropriate first-floor department offices which are

# queen's park goes king- size







*Contemporary sculpture and murals dominate those areas of the new government centre open to the public. Works of art worth \$300,000 were commissioned for the buildings. Bronze figures are by Jack Harmon, of North Vancouver.*

**ten thousand civil servants will ultimately occupy this ontario government centre where the window cleaners use two-way radio and the monthly power bill now tops \$50,000**



encircled by a wide internal corridor-mall. This floor also boasts a rapid-service cafeteria and kitchen, plus banks of elevators that will ultimately serve all four towers.

The second-floor mall extends through the main lobby area in the form of a bridge. The Macdonald Block contains committee rooms plus an auditorium to accommodate 700. Underground are two levels of staff parking.

The centre also features an efficient loading area under the Ferguson Block. Trucks enter off Wellesley Street, and drive into the lower depths of the building to unload their wares, which are whisked away to appropriate destinations in Macdonald, Ferguson and Hepburn Blocks.

And it's in the basement where the mechanical and electrical action is. The equipment includes one of the most all-embracing environmental control systems

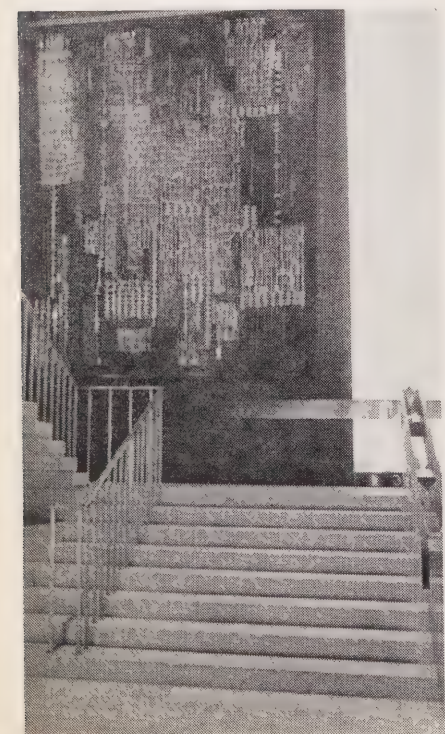
found anywhere in Canada — a solid state electronic control panel that can scan 2,000 sensing points a minute. It checks items such as temperatures, water pressure drops, water flow and air conditioning, and can quickly establish the cause of any failure.

All control points are continuously fed into a memory unit and recorded automatically on a typewriter — in red for trouble, in black if normal. The panel supplies information to technical personnel enabling them to diagnose the fault in the system and initiate corrective action either through remote control point adjusters or by repairmen.

This procedure saves the need for lengthy, and often costly, investigation. It also features an electronic fire alarm enunciator which pinpoints a fire anywhere in the complex.

Another interesting aspect is a two-way radio system linking the panel with window cleaners who use electrically-





operated platforms for each high-rise building. In the event of a power failure, the cleaners can communicate with the panel operator.

In the old days, a window cleaner simply opened a window if he got stuck up there. Or he kicked it in. Not any more. Environmental control cries out for sealed windows.

Another control panel feature helps to ensure a smooth load on the electrical system, for in a complex this size there's a lot of electrical power being put to use. Supply comes from five Toronto Hydro vaults located under the sidewalk, just outside the perimeter of the new buildings.

How much power will be used? In spite of a combination oil and gas-fired heating system, an average of \$52,000 worth of electric power is consumed each month, excluding the Whitney Block and the legislative buildings. When the Hearst and Mowat Blocks are built this figure will jump to an estimated \$75,000. Much of this will be accounted for by the heavy air-conditioning load produced by four huge 1,500 h.p. compressors in the Ferguson Block basement.

Another example of size is the Macdonald Block's cafeteria, perhaps the largest in Canada, featuring the "scramble system" for faster service through decentralization of the soup, the main dish and desserts.

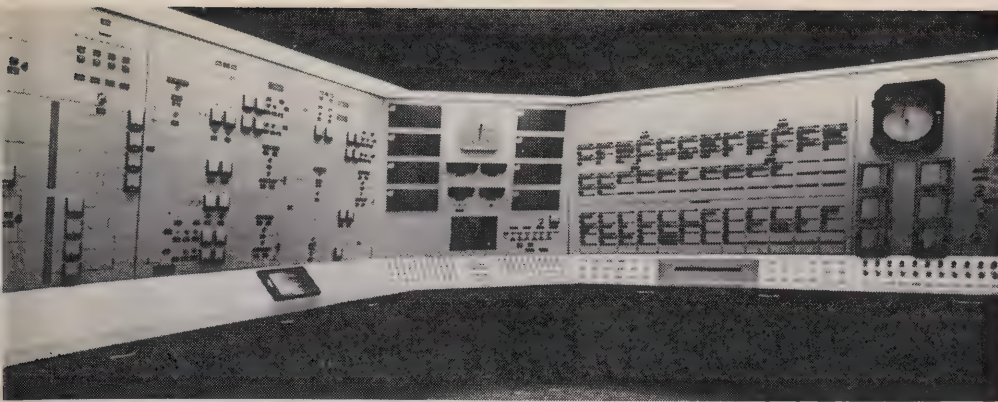
No long line-ups any more, but the cafeteria remains closed during coffee breaks. No matter how rapid the cafeteria service may be, the provision of sufficient elevators would have been far too costly to handle the volume of human traffic at coffee time. Instead, a small coffee room — capable of holding 30 people — is available on each floor.

Do venetian blinds contribute toward aesthetics? Yes, say Queen's Park officials, who would gladly usher you outside and from a distance point to their three new buildings. Voila! Not a blade out of order. Perfection. It should be explained that the blinds cannot be raised or lowered, only the angle of the blades adjusted with a knob at the window. This prevents the untidy appearance of most modern office buildings.

And talking of aesthetics, the buildings have \$300,000 worth of Canadian murals and sculpture, located in the Macdonald Block of the new development.

Queen's Park inhabitants are extremely proud of their complex, and rightly so. □





Toronto artist Donald Lewis poses in front of his mural in the Macdonald Block. Eskimo figure was sculptured by Paulosie Kanayook, of Northern Quebec, while tapestry is the work of Michelene Beauchemin, Quebec City. Environment of the many and varied office areas, below, is monitored in a central control room.





*Hydro engineers feed data into computer and discuss the results. Because of the time lag involved in operating the remote teletype terminal, each user has the impression that he alone has access to the computer located at a Toronto time-sharing centre, extreme right.*



# shared time

by Neil McMurtrie

An engineer sits down at a teletype machine and dials a number. Operating the keyboard with two fingers, for he is no expert typist, he painstakingly picks out a few simple words. Then he proceeds to feed several lines of mathematical data into the machine.

No sooner has he finished than the answer starts to chatter back. His problem solved, he signs off . . . "Bye." Of course, he's talking to a computer. What is remarkable, however, is that 40 other people are also using the computer at the same time.

The secret is time-sharing, a service that gives dozens of customers the use of a central computer from teletype terminals in as many different offices. Because of the time lag involved in operating the teletype, the computer can dash off most calculations in a fraction of a second, giving each operator the impression that he alone has access.

Testimony to the success and potential of time-sharing is the number of computer utilities which have sprung into being in the past two years. Time-sharing companies supply computer services in much the same way that electric power or telephone service is supplied.

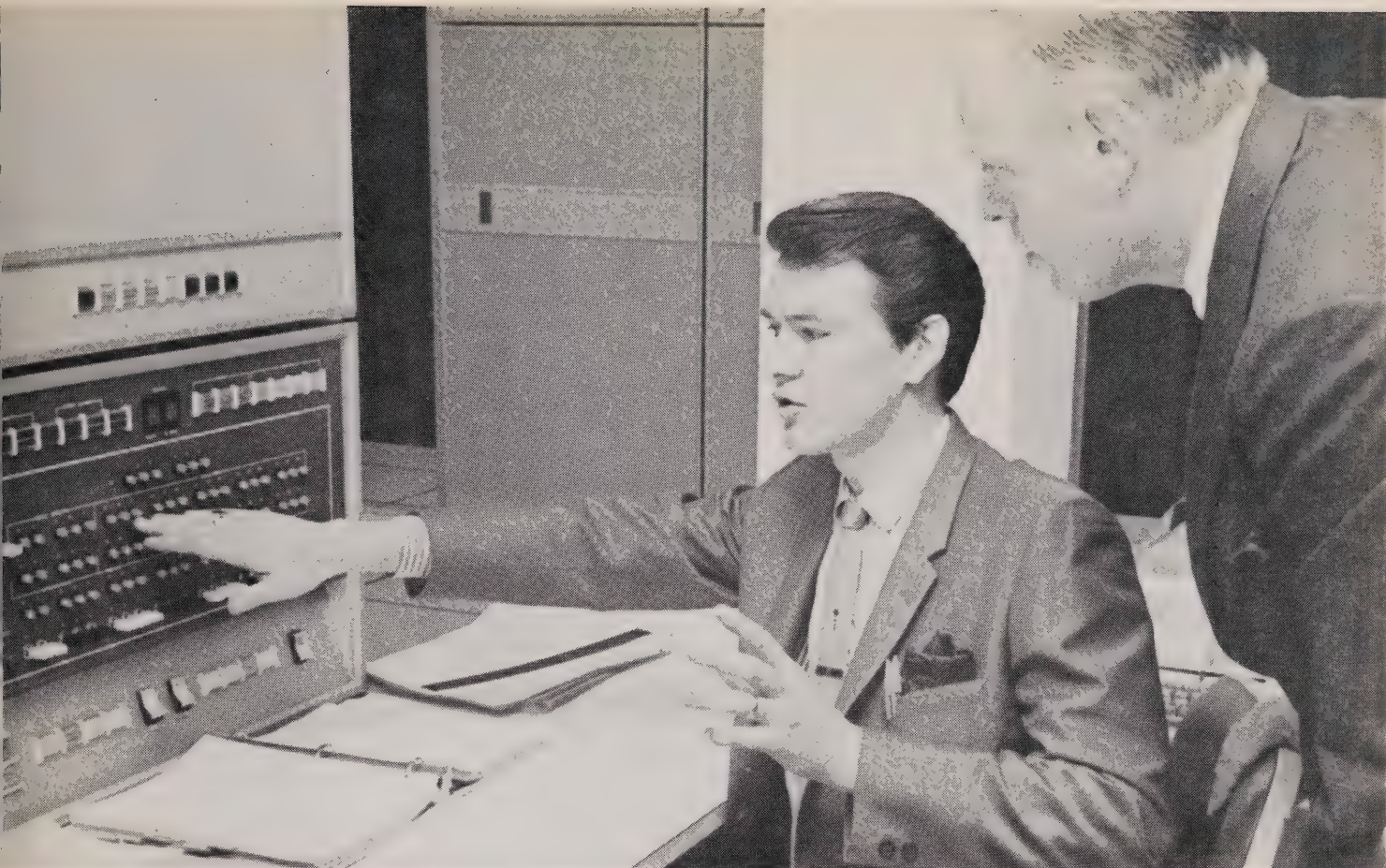
The great advantage to the customer is the economy when compared to the tremendous cost of buying and running a large modern computer. It's also leading to widespread use of computers in a variety of jobs because customers can try out the service on a month-to-month basis with little commitment in either space or money.

In spite of leasing a major computer system consisting of a Univac 1108 and an IBM 360/65, Ontario Hydro still finds it economic to rent computer time from Canadian General Electric for certain specialized jobs. In all, 10 teletype terminals are hooked up to a GE 265 installed in offices on Toronto's King Street.

Two of the terminals are available to about 30 engineers and technicians in the Tra







# is saved time

sion and Distribution Projects Division, where they are used on such problems as calculating the tension and sag of conductors, the swing of insulators and conductors in the wind and various aspects of design.

certainly, time-sharing saves time. Specific tension calculations, which would take at least a day by desk calculator, are now worked out in 20 minutes on the teletype. A series of underground cable ratings for alternative schemes, which previously could have taken two weeks, are now done in half a day.

All this, the division pays a monthly rental of about \$1,600 for the two terminals.

Part from economy and convenience, the real breakthrough in time-sharing lies in the development of a simple programming language called BASIC. Far easier to understand than other computer languages, such as FORTRAN, the commands in

BASIC are coded to resemble appropriate English words. Thus the user gets the impression of talking to the computer.

For example, the word "Stop" will terminate the computation at any point in the program; the word "Save" will store the program in the computer's memory circuits. The operator gains access to the computer with a friendly "Hello" and signs off with a cheery "Bye." The machine responds in similar vein. To an unintelligible command, for instance, the machine replies "what?"

The average design engineer needs only a one-day course of introduction to BASIC and how to operate the terminal. His skill will grow as he starts to write programs and operate the machine on a regular basis.

Naturally, there are limitations. An obvious one is the relatively slow speed at which the teletype can handle data. It types output from the computer at 10 characters a second, taking about five minutes to generate an 8½ in. x 11 in. sheet of printout. Another limitation is the length of the

program, which in a typical system is restricted to about 150 instructions in BASIC. This, in turn, places a restriction on the complexity of a problem that can be handled.

But the advantages far outweigh the drawbacks. Time-sharing permits cost-sharing. A typical operation costs about the same as hiring an additional engineer, but the productivity of engineer plus computer averages about five to eight times that of the engineer using normal methods.

And that's what the current interest in time-sharing is all about. □



# true to

by Gordon Murphy



Businessmen, engineers and representatives of the news media met at the IBM headquarters in New York last year to witness one of the most startling advances in printing since the introduction of machine-set type.

The push of a button on a remarkable computer-controlled photocomposing unit resulted in a single, audible click. And the demonstration was over.

Printed for all to see were these words: "This paragraph was set by this unit in a tenth of a second — twice as fast as a watch ticks. An entire newspaper page can be set in as little as 30 seconds, and a 300-page novel in less than 30 minutes."

This was no demonstration of an interesting laboratory experiment. At a time when most of the printing industry is still molding characters out of hot lead, the new unit is

available now at a monthly rental of about \$8,600. Alternatively, it can be purchased outright for \$387,000.

Industry leaders are already looking beyond this and similar equipment for faster means of typesetting to keep pace with the world explosion of knowledge, now said to be doubling every eight years. Even systems that print a page at a time at speeds up to 10,000 characters a second are considered too slow for the accelerating rush into the future.

One such system, known as the Linotron 1010, delivered to the U.S. Government Printing Office in Washington about a year ago, set type for an 81-volume catalogue of 36,000 pages in six weeks. The job would have taken a year, even by some of the

sophisticated "second generation" electronic photocomposers now in use.

Speed is the driving force behind production of the printed word, an industry the Chinese are credited with starting back in the second century AD when an unidentified mandarin, presumably weary of pen pushing, used imprinted wood blocks to stamp seals and signatures.

Not until the 15th century was any major advance made. That was the invention of movable type — separate blocks for separate letters — and the use of metal instead of wood. It was an advance that enabled William Caxton to produce in 1477 the first book printed in English — "The Game and Play of Chesse".

Time and print stood relatively still for another four centuries, until the introduction in 1886 of machine-set type, a revolutionary advance that set the stage for the coupling of the printing process with electricity.

The aging "first generation" of mechanical typesetting equipment was ushered in before the turn of the century by the Linotype, a machine which, with many refinements and such sophisticated auxiliaries as computers, is still the basic item of typesetting equipment in most newspaper plants and many commercial printing houses in Canada and the United States.

In the Linotype, metal is cast one line at a time — hence the name of the machine — by an operator at a keyboard similar to that of a typewriter. Characters are stored in a magazine on matrices or individual pieces of metal with letters, numerals and punctuation marks cut into them. Pressure on keys causes selected characters to drop to a revolving belt for dispatch to an assembly area, where they form a line.

The completed line then moves to a mold next to a container of hot metal. A piston forces the metal into the mold and against the face of the matrices, producing a finished line.



# type

*Thousands of times faster than the hot-lead method of type-setting, below, the new IBM photocomposing unit, far left, is capable of tackling a job like the Toronto telephone directory in about three hours.*







metal bar with the line of type impressed on it. Computers came to the aid of the printing industry several years ago. Printers and publishers in the Toronto area, including the Daily Star, the Telegram and the Globe and Mail, all use them. So do the Hamilton Spectator and the Brantford Expositor.

According to an IBM spokesman, the printing and publishing industry in Southern Ontario is the most highly computerized in North America. Uses include both typesetting and commercial operations, and range from handling payrolls and subscriptions to automatic line justification. (A justified line is one in which the type fills the width of the column, as in most newspapers and magazines, and takes care of the hyphenation problem in the process.) Allied with the computer, first-generation typesetting becomes a much faster, more accurate and more versatile operation. Material to be printed is first punched into a tape, along with instructions, on a perforating machine. The tape then goes through a tape reader and directly into the computer to obtain a completely programmed tape ready to be run through an automatic linecaster, which is an up-dated version of the Linotype.

The Canadian Press wire service is also equipped with computers for production of justified tapes of standard newspaper column width. The tapes are fed to the papers taking the service and are run directly through linecasters for typesetting.

Photosetting was introduced almost simultaneously in the late 1950s by several companies. Now being used by about seven per cent of Canada's commercial printing firms, but thus far with little impact on newspaper publishing, its basic compo-

nent is a camera-equipped storage area in which all characters of a type face are recorded on film.

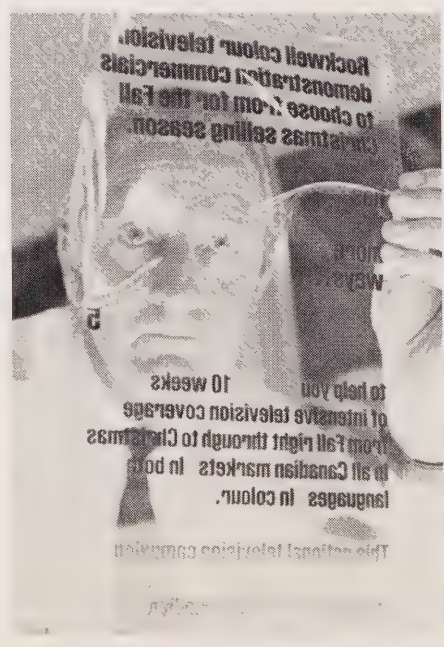
Copy and instructions about the type face, size and line length are punched into a tape in the conventional way. The tape is fed into the camera unit where a pencil of light relates the tape to the stored information and selects the characters to be reproduced on film. This film is then processed and the material on it recorded on a sensitized metal plate by etching the plate in a bath of acid. The plate is then ready for the press.

Similar in basic technique, but thousands of times faster, the third generation of photosetters replaces the storage unit with a cathode ray tube. Characters projected on the tube are then photographed. The film is developed and the plate made in the usual way.

The third-generation process makes it possible to produce a wide variety of type faces, line drawings and scientific graphs. The more advanced systems utilize a digital logic network (a computer recorder) along with the cathode ray tube and camera, and copy is typed on a keyboard directly connected to this network.

The operator first indicates what type face he wants and the network selects the style from its memory bank. As the copy is typed, the network generates the characters on the cathode ray tube in justified lines by firing an electron beam through corresponding characters in the stencil being cut by the operator.

Such systems have the potential of setting any conceivable style of type in any language. And with more expected to happen in the next 10 years than in the entire history of printing and publishing, experts



*Punched tape is prepared on special keyboard, below, before being fed into photosetting unit in Ontario Hydro's printing department. Bottom photo shows type reproduction on transparent film at the Mono Lino Typesetting Company in Toronto.*



agree that today's newspapers, magazines and books are in for a drastic face-lift. In fact, the growing importance of electronics in the printing industry has already resulted in a number of mergers between electronics and publishing companies.

Newspapers are in a particularly vulnerable position in this electronic age. Most are still in the "hot metal" stage of typesetting. Beset on all sides by rising production costs and harried by the increasing competition of radio and television, they must increasingly speed the printed word to the reader if they are to compete — and survive.

Their big hang-up is the relatively slow and costly process of preparing raw copy for the press.

"The natural solution," says one expert, "is to combine the speed of electronics, the image-making abilities of television and the organizing capabilities of computers with the flexibility of print."

All of which spells money. If it's any consolation, that third generation equipment delivered to the Government Printing Office in Washington cost \$2,185,000.

But savings from elimination of paper waste, unnecessary printing and from other areas are expected to amortize the cost of the installation in less than 18 months.

That also spells money. □



# along hydro lines

## Sunshine city

Orillia has caught up with a sign over its municipal building. With the stroke of the new year, Orillia moved from town status to that of a city. The sign had proclaimed "Orillia City Hall" since it was erected in 1917.

The community traces its origins back to 1615 when Samuel de Champlain, along with a band of Indians, stopped to fish at the narrows between lakes Couchiching and Simcoe where Orillia stands. In 1835, about 200 people lived in the settlement then known as Newton. It became a village in 1867 and a town seven years later after a railway and lumbering boom.

But it wasn't until 1967, when the town annexed 3,000 acres of neighboring Orillia township and inherited 4,000 new residents, that it attained sufficient size to qualify for city status.

One of Orillia's main claims to fame was through humorist Stephen Leacock, whose wit made the town known around the world as Mariposa in his best-known work, "Sunshine Sketches of a Little Town." □

## tribute

Fifty years of service to the Dundas Community Centre Board and Recreation Committee were well noted in the town when D. P. (Bud) Cliff, Ontario Hydro's first vice-chairman, was guest of honor at a civic dinner.

Mr. Cliff was chairman of the finance committee and a member of the building committee when a new arena was erected in 1950. He was also mayor at the time a survey determined the public's desire for an arena. A voluntary campaign raised the \$35,000 needed.

Mr. Cliff was presented with an illuminated scroll and an electric clock. The scroll, which outlined his contributions to the town and paid tribute to him, said in part: "As a result (of his work), great progress and improvement has been made for the betterment and pleasure of the citizens of this community." □

## HOMECEC switch

The revised replacement schedule for electric appliances supplied to schools under the HOMECEC plan has been approved. The new five-year cycle is identical to that used for electric ranges.

At the time of installation, Ontario Hydro will pay the manufacturer the full price and will, in turn, bill the participating munic-

ipal utility for 32 per cent of that figure. The balance will be carried by Hydro until the appliance is removed, at which time the manufacturer remits to Hydro 68 per cent of the original price.

Under the old plan of yearly changeover, the manufacturers had difficulty disposing of used appliances. The new program was jointly developed by the HOMECEC sub-committee of the AMEU, the manufacturers and Ontario Hydro. □

## Under canvas

Construction crews at Ontario Hydro's Nanticoke power station on Lake Erie went "under canvas" this winter to begin the delicate task of placing concrete. For the next two years, regardless of weather, the crews will place between 100 and 200 cubic yards of concrete a day to build a powerhouse 20 storeys high and almost three football fields in length.

Tents made of polyethylene and canvas protect the wet concrete as it is placed into heated forms and housings with additional steam heat as a safeguard during the settling. By late 1974, four generators will contribute 500,000 kilowatts each to the provincial power network. The station, fuelled by coal, will cost an estimated \$266 million. First power is expected in 1971. □

## Former head of research dies



Hugh C. Ross

Hugh C. Ross, director of Ontario Hydro's Research Division from 1957 to 1967, died in Toronto last month after a long illness. Mr. Ross joined the Research Division in 1929 after graduating from the University of Toronto in civil engineering.

During his early years in the division, Mr. Ross was concerned with concrete technology, but later he was involved with problems in other areas of structural and mechanical engineering. He played a leading role in planning the W. P. Dobson

Research Laboratory, Etobicoke, which replaced downtown facilities in 1961. □

## Northern waves

Residents of Abitibi Canyon can now receive the Canadian Broadcasting Corporation over a low-power local radio transmitter.

The new 40-watt radio station carries programs from the CBC network as well as those developed specially for listeners in Northern Ontario. The Canyon residents man and maintain Ontario Hydro power plants in the area. The community is situated about 500 miles north of Toronto.

Coming in at 140 on the dial, the CBEW station has a range of 10 miles. It carries no commercials. □

## Half a lifetime

George Hutcheson backed into the electrical world 40 years ago, but has left in a blaze of praise.

Having spent more than half his life as an elected member of Huntsville PUC, the 77-year-old veteran was honored last month at a dinner attended by provincial and local officials, friends and relatives. He retired from the commission in December.

At the dinner, D. P. Cliff, Ontario Hydro's first vice-chairman, described Mr. Hutcheson as "one of Ontario's great men . . . one of the cherished characters of our day."

Public service provided the key for him to contribute a natural talent to the electrical industry, said Mr. Cliff. When Mr. Hutcheson graduated as an electrical engineer in 1917, lack of opportunity



D. P. Cliff





*A hobbyhorse called Hydro*

prevented him from entering the field. But he was determined to play his part, so after establishing himself in the insurance business he became a member of the PUC in 1928.

Replying, Mr. Hutcheson, who points to his 1948-49 term as president of the OMEA as the highlight of his public career, said: "We live in a democratic society which demands certain obligations. Those who reject this are being selfish. It costs a lot to serve, but there is a satisfaction of having done something. Hydro became a part of my life, but in reality it was a hobby."

Seen with Mr. Hutcheson, third from left, are I. Carl Ingimundson, Ontario Hydro's Georgian Bay regional manager; W. Ross Strike, former chairman, Ontario Hydro; Dr. J. E. Wilson, commissioner, Barrie PUC; Mr. Cliff; and R. J. Boyer, Muskoka MPP, second vice-chairman, Ontario Hydro. □

## Another COMPEC

Seven municipal utilities surrounding Oshawa have joined together in a co-operative marketing program similar to the Co-operative Marketing Plan—Essex County (COMPEC for short) which went into operation in 1967.

Included in the plan are Ajax Hydro, Bowmanville PUC, Newcastle Hydro, Orono Hydro, Pickering PUC, Port Perry Hydro and Whitby PUC. Ontario Hydro will act as partner to the utilities, providing sales staff and guidance to the group. Oshawa PUC officials have attended meetings of the association as observers.

Like COMPEC, a six-man advisory committee has been set up to make general policy and give the organization direction. □

## Helping hand

Fred Gneuchel, a 19-year-old student from Chatham now attending the University of Waterloo, has received a \$300 cheque from Guy Morrison, chairman of Chatham Hydro and president of District 8 of the OMEA.

Each year the district association awards a bursary to a high school graduate planning to continue his or her education in electrical or electronic engineering. The award is rotated among students from Lambton, Kent and Essex counties, which make up District 8. □

## Sharpshooters

While the CSA Testing Laboratories has acquired a ballistics testing range, it doesn't mean that inspectors are wearing shoulder holsters and playing 007 games. The range is used to measure the velocity of projectiles from explosive-actuated tools.

In the construction trade, tools of this type are used to drive fasteners into concrete and steel. Although they have been in use for a number of years, only lately have standards outlining their

safe construction and operation been established. Despite elaborate safety measures to prevent unintentional or malicious firing the responsibility rests with the operator to carry out safe operation.

In addition to testing the mechanical safety, CSA is developing safety instructions for operators. And no wonder. Some of the fasteners have been clocked at twice the speed of sound.

## A second Welland?

United States Army Engineers are studying the feasibility of a new canal to link lakes Erie and Ontario. According to Donald Liddell, an Army spokesman, the new canal would be an American as opposed to the all-Canadian Welland Canal.

The proposed deep-draft waterway would run parallel to the Niagara River for about 15 miles then cut overland in a 600-foot wide passage for 17 to 25 miles depending on the route. Liddell said the Welland Canal has almost reached its capacity in tonnage and number of ships. "The new canal would handle the overflow and also accommodate much larger vessels," he said.

## New office



*Housewarming session*

Listowel PUC is comfortably settled in its new office building following an official ribbon-cutting ceremony last month. I. Stubbs, retired consumer service and sales engineer from Ontario Hydro's Niagara Region, wielded the scissors.

Members of the public toured the \$30,000 structure after the ceremony. Included in the one-storey brick building are a combined manager's office and board room, general office, staff room and storage vault.

E. M. Creighton, PUC chairman, said at the opening that the staff had worked under adverse conditions while the building was being completed, but now were happy in their new home. I. Stubbs said the building was practical and would meet the needs of the community for some time. Figures for 1968 showed an increase in the utility's peak load of 6.6 per cent.

Shown at the ribbon cutting are Paul Schaefer, designer; Robert Moogk, PUC manager; Herb Gerster, contractor; E. M. Creighton; Adam Park, designer; and Mr. Stubbs.

## Huff and puff

When Ontario Hydro's research people talk about the relative "tightness" of a house, their minds couldn't be further from alcohol.

For the past two years, research engineers have classified about 40 electrically-heated residences into three categories—"problem", "tight" and "leaky"—in a study of the effect of tightness on heating. Essentially, the test consists of installing a powerful exhaust fan then measuring the pressure difference



between the inside and outside of the house. So far, some correlation has been found between tightness and such problems as high indoor humidity. Leaky houses have problems with heat loss.

Further tests are continuing. The overall objective is to develop a simple technique for classifying electrically-heated residences according to tightness and to find a ready means of ventilating and tightening houses as required. □

## Home for new ideas

The National Housebuilders Association is in the midst of building a better mousetrap. And it's aimed at solving Canada's chronic housing shortage.

The group has constructed an experimental house at Kitchener using new materials and techniques. Built on land donated by the city, the four-bedroom, two-storey house is being rented with the stipulation that the occupants report on living conditions and improvements needed. It took only 50 days to complete — about one-third the normal time.

According to the association's research director, one of the primary objectives is to get builders to accept new products and ideas. Among the innovations in the house are: a basement of four-inch precast concrete slabs, installed in one day; electric-insulating sandwiched between two drywalls; a complete water system using plastic piping and a three-section bathroom that takes 15 minutes to install. □

## Sign of the times

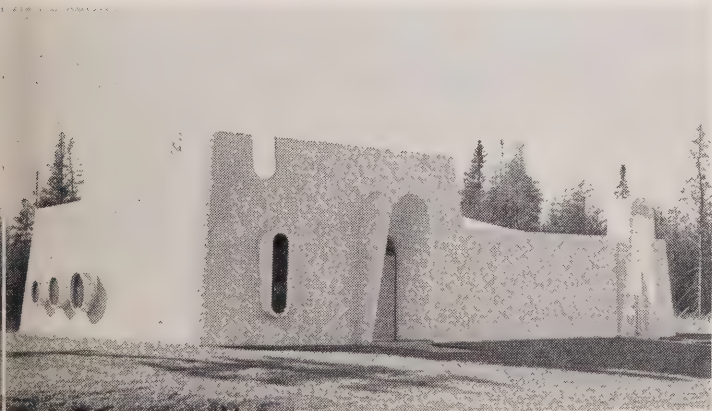
Like just about every other area of the economy, rents in rural Ontario are going up. And in this case, it's Ontario Hydro that's feeling the squeeze.

The commission has recently agreed to raise fees to be paid to farmers where power lines cross their land. For a high-tension tower on good land, the fee has gone up 50 per cent to \$315. For a single pole, it moved up 100 per cent to \$28. Hydro negotiated the schedule with the Ontario Federation of Agriculture. The farmer has a choice between a lump-sum payment or spreading it over 20 years.

The compensation is for occupying the land. Other arrangements are made on an individual basis for damage or losses during construction of the tower or pole line.

The schedule was last revised in 1957. □

## Lay out



Information transformed

When Fort William Hydro first asked Jean-Paul St. Jacques to design a substation, it's doubtful whether they anticipated the end result. He tied the future to the past by creating a 20th century fort. Now the public can't help linking the FORT in Fort William to the utility. □

# municipal briefs

A career of public service that spans more than three decades has come to an end in Hastings. With 33 years as a member of the Hastings PUC, Harold G. Fairman decided to retire at the end of 1968. He had been chairman for several terms.

A banquet was Beachville Hydro's way of saying "thank you" to secretary-treasurer B. A. Finch, who has retired after 46 years' service.

W. Austin Husband has been promoted to the position of chief operator with Mississauga Hydro. After a 16-year career with Ontario Hydro, Mr. Husband joined the municipal utility in 1965. He had previously worked at Toronto, Burlington, Niagara Falls and Barrie.

Half-a-century of marriage was celebrated by Mr. and Mrs. Jack Phillips, of Schreiber, last month. Mr. Phillips had something else to celebrate as well. The OMEA stalwart was elected to his 27th term on the local Hydro commission.

Archie Truchon, after 40 years with Ontario and North Bay Hydros, has retired. To mark the occasion, the commission presented him with a wrist watch. Mr. Truchon started with the provincial commission in North Bay in 1928, then transferred to the local commission when the city purchased the system in 1940.

Ridgetown PUC has named its new \$35,000 substation in honor of the late Archie Warwick, a veteran member of the commission who died last year. His widow, assisted by his daughter, unveiled a plaque at the station in a recent ceremony. Mr. Warwick began public life as a councillor then served as mayor in 1934. He served as commissioner from 1935 to 1938, from 1950 to 1955 and from 1962 to 1967.

Safety is a habit with Rainy River PUC employees. At the traditional staff dinner given by the commission, Superintendent Rene Berard and fellow workers Leo Bremault and Elmer Godin received a certificate from the Electric Utilities Safety Association for another year without a compensable accident. It was the 10th consecutive year, dating back to the award's inception, that the commission has received the certificate.

William F. Nickel, 78, a member of Stratford PUC since 1950, died recently. During his 18 years in office, he had been chairman on four different occasions and was chairman at the time of his death. A life-long resident of Perth county, Mr. Nickel served as an alderman for five years before moving to the utility. He was a teacher by profession and taught in the early 1900s before joining British Mortgage and Trust, where he worked from 1916 to 1960.

Hydro bills in Mississauga will be getting fatter. The weight gain won't be due to heavier rates though, but will be part of a public relations campaign by the town. Accepted by town council, the proposal calls for the local Hydro to act as distributor of informative literature.

Torontonians will now pay more to be reconnected if their service is cut off for failure to pay their hydro bill. Toronto Hydro has upped its re-connect charge from \$3 to \$5. The higher fee is aimed particularly at absentee landlords who collect money from tenants for hydro bills then never pay them. One man ran up a \$1,000 bill on an apartment building.

Nicholas Tutt has been appointed acting superintendent for Arthur PUC. The new superintendent was employed by Detroit Edison as a journeyman-lineman before joining the local utility.

A \$1,379,000 scheme to put part of Mississauga's electrical distribution under ground has been proposed to the town council. Hydro manager Bert Fleming said it would cost about \$25 a foot to put each of the 27,600-volt circuits below ground.

Kingston PUC won't be getting into the community TV antenna business. The Canadian Radio-Television Commission has turned



down a request by the utility for an operating licence. It explained that broadcasting licences cannot be issued to government bodies other than the Dominion government, nor to corporations owned by them.

**Drinking better** electrically could be the motto in Dresden if a water purification system like that in Whiting, Indiana, is adopted. Officials from Dresden Utilities Commission, local industry and the Ontario Water Resources Commission recently toured the American plant where electrical power is used to purify water in what is called "ozone" treatment.

**Two employees** of Hamilton Hydro are serving on the 1969 executive of the Niagara District Electric Club. J. M. Dingwall was elected president of the club and T. W. Woodhouse became secretary.

**The move** is on in Kingston. PUC employees began moving into the commission's new Counter Street service centre a few weeks ago. It's the first step in a relocation that will eventually mean the transfer of all but transit operations from downtown to the more accessible site. The electrical, gas and water departments moved first to the \$650,000 building. Clerical staff from all departments will follow when an administrative building is constructed next to the service centre.

**H. W. Vine**, chairman of Napanee PUC, died last month at the age of 65. First elected to the commission in 1958, Mr. Vine was serving his fourth term as chairman.

A life-long resident of Napanee and a keen sportsman, he first entered public life in 1945 as a councillor. In succeeding years he was deputy reeve, reeve and mayor. Mr. Vine operated Napanee Fuel and Supply from 1933 until his death. In addition to belonging to the town's volunteer fire brigade, he was a delegate to the Napanee Region Conservation Authority and headed its Water Control Advisory Board.

**Digging** in front of a bank can be rewarding. Peter Mitchell turned up an old coin while Picton PUC workers were excavating in front of the local Canadian Imperial Bank of Commerce last month. In almost mint condition, the coin is an American 1857 half-dime and bears 13 stars denoting the original colonies.

**John McMechan** is celebrating his 40th anniversary in business this year. The chairman of Toronto Hydro has been running his Donlands Dairy in East York since 1929. He built up the three-employee firm to its present staff of 300 serving the whole of Metro Toronto, Oshawa and Hamilton. In the early days, Mr. McMechan drew 90 per cent of his business from residential delivery; now it accounts for only 25 per cent with the balance going to stores, restaurants and other wholesale customers. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Do you know any enterprise that did \$6 million worth of business last week and still managed to give its customers a bargain? Well in 1967, the most recent year for which statistics are available, Ontario's municipal electrical utilities derived \$316.8 million from the sale of energy.

Of course, the average customer is more likely to be curious about what was done with the money he paid to his local hydro or PUC. His impression and his appreciation of municipal utilities is gained or lost at his own doorstep, with the specific utility that serves and bills him for electricity.

In response to this situation and in an effort to keep their cus-

tomers better informed, several utilities now prepare a simplified annual report and distribute it to their customers each year. In fact, about 360,000 municipal hydro customers, 22 per cent of all the people served in Ontario, received an annual report from their local utility last year.

Samples of these reports and other literature will be on display at the OMEA-AMEU annual convention in Toronto next month. To help and guide others who would like to issue their own, OMEA-AMEU public relations committee is preparing a suggested annual report that can be adapted for use in any municipality.

\* \* \*

Last month we mentioned East York Hydro's use of newspaper columns to communicate with customers. Others in Ontario have also been alert to this opportunity. In Oakville, in a monthly column called "PUC Report", readers are introduced to various utility employees, and provided with highlights of the commission's activities. The Port Colborne paper prints a copy of the hydro superintendent's monthly report of service additions, transformer and line changes. And for several years, London PUC has run a column on the second page of the local newspaper each Monday signed by Mike the Meterman. Mike chats about the policies, activities, and various services provided by the PUC. Not only do these columns keep people informed, but their very existence demonstrates a desire to improve communication.

\* \* \*

Unpaid accounts bother Peterborough PUC like anyone else, but the commission there recently decided to compare the direct cost with the indirect but very real cost in goodwill. Like others doing business with the public, the PUC got its share of bad debts. These could be turned over to a collection agency, but the commission has decided to pursue them itself to avoid bad fees. According to a newspaper report, delinquent accounts in Peterborough were only one tenth of one per cent of all the accounts in 1968.

\* \* \*

Feedback has been borrowed from the jargon of electronics. Most people recognize it as a response or reaction in the communications process. Conducting a survey by questionnaire provided some useful and welcome feedback to Sudbury Hydro last fall. They asked customers their opinion of electrical service and how they felt about bi-monthly billing. About 14 per cent responded, higher than average participation for a sizeable utility. There was strong feeling about keeping the rates low. On the billing question, 75 per cent of the customers who replied were satisfied with a bill every two months, 12 per cent would prefer to be billed every month, and 13 per cent had no preference.

Typical customer response was summed up with the comment: "If there is room for improvement, I'm sure your people will find it." That's what you call confidence.

### December energy production

Primary energy provided by Ontario Hydro in December totalled 5.43 billion kilowatt-hours, an increase of 11.1 per cent over the same month a year ago. For the 12 months of 1968, the total is 55.79 billion kilowatt-hours, up 8.6 per cent over the same period last year.

Adjusted for seasonal influences, primary energy demand in December was 4.98 billion kilowatt-hours, 3.3 per cent more than the previous month. The seasonally adjusted total for December represents 59.8 billion kilowatt-hours at annual rates. This is 429.9 per cent of the energy demand in 1949.





## Don Wright sees it

me was when diamonds were a girl's best friend, but not any more. Mink is for finks and gold will earn you a yawn but give her californium and you've got it made. Mind you, it's expensive. Manufactured as a by-product of the atom-splitting process, this particular little radio-isotope tails at about \$100 for one-tenth of a microgram. Not impressed? Well that's only about one ten-billionth of a gram so that a pound of the stuff will set you back \$450,000,000,000 – far more than the cost of a pound of prime beef although the latter is rapidly catching up.

But the price of californium is expected to drop a little as 50 cents per microgram by 1980 as the result of increased production and know-how. A pound then will only cost about \$225 million, which is only a little more than the price tag on Hydro's 2,000,000-kilowatt Lambton generating station.

If the word of the US Atomic Energy Commission is to be trusted, this is a fantastic bargain and we've got to admit that as a source of neutrons, californium is hard to beat. Each gram emits about two million million neutrons per second, which makes it 300 times more efficient than the next best source, and should produce enough to provide every man, woman and child in the world with two shopping bags full.

For those who find the prices attractive and want to switch their basement facilities from no production to the new isotope – a word of caution. Californium is pretty far removed from the wine-maker's art. In fact, to produce this material, among the world's rarest, it is necessary to start with plutonium and work one's way through the successive transmutations of americium, curium and berkelium before arriving at californium. It's a long trip and must be considered beyond the scope of most of us – even with one of the more expensive chemistry sets.

In addition to being valuable, californium is likely to be useful. It's expected to better our health through improved medical techniques, give us higher quality industrial products and increase our energy resources.

Still, it's just a radio-isotope and scientists are discovering all kinds of these fission products in the wastes which remain in the spent fuel from our nuclear reactors. Far be it from us to discourage the enterprising. A few hours spent prowling around these nuclear garbage cans with

a stick and a piece of gum could be time well invested.

■ Taxpayers must have been highly amused at the antics of those mischievous little rascals down in Montreal who recently put the boot to a few million dollars' worth of university computing equipment. The odd fuddy-duddy may take offence on the grounds that taxes are already a trifle steep but resentment will be confined, for the most part, to the unenlightened and those too old to remember their own childhood tantrums.

*Breathes there a babe with soul so dead,  
She's never broken a dolly's head?  
Or petulant lad so well behaved,  
He's never succumbed to a fit of rage?*

Looking back to our own childhood, in the early days of our nationhood, we seem to recall an incident not so far removed, in kind at least, from the Montreal episode.

This involved footing a soccer ball upon such a course as to render contact inevitable with a basement window in Creighton Street Public School, located in an easterly section of Bytown (later named Ottawa).

Unfortunately, the principal of this admirable institution happened to be surveying the scene from a vantage point just one floor above the window in question. It was his considered opinion that the trajectory of the ball had been carefully calculated and that, in the interest of the public school supporters, restitution was in order.

This took two forms. One was monetary and the other physical. Both were painful.

But the point is, they seemed to work. During the length of our brilliant scholastic career, which commenced at Creighton Street PS and ended there some 15 years later, school property remained sacrosanct. Had we aspired to junior high, there is every reason to suppose that our respect for the physical accoutrements of learning would have continued.

But those were simple days and such primitive punitive measures would scarcely be effective in the sophisticated social system of today. And don't think for one minute there's anything backward or primitive about destroying public property. Particularly not in the Montreal incident where only the most sophisticated and advanced electronic equipment was kicked and clubbed into submission.

■ Speaking of behavior, it's becoming quite evident that our psychologists and sociologists are just as crafty as their titles imply. Under the guise of scientific investigation, they're making good money and having a ball.

Take that group from the University of Illinois who've been examining the relative emphasis men place on breasts, buttocks and legs in assessing female pulchritude. Well-cloaked in professional weasel talk, their recent article in the "Journal of Personality and Social Psychology" nevertheless reveals what we've suspected right along – these birds are having all the fun.

In explaining away their avid interest in the subject, they observe: "We know less about attractive stimuli for man than we do about those for fish."

Still feeling somewhat guilty, they quote from Scodel (1957) to this effect: "It is, indeed, rather curious in light of the numerous attempts

to view all behavior and attitudes from Freudian assumptions that a topic which so preempts the conversation and fantasies of adult males should have been so completely ignored for systematic investigation."

Marvelous! The way was now clear for systematic investigation (titillating snooping) and the group went to work with a will. Just a word about their methods. Male students were the subjects and the stimuli consisted of female silhouettes constructed in such a manner that three dimensions (breast, buttocks and legs) were varied independently. Quoting directly:

"Each of the dimensions could assume the value of the standard (0) or could be moderately large (+1), large (+2), moderately small (−1) or small (−2). Twelve of the stimuli were constructed such that only one of the dimensions assumed one of the four values other than zero. For example, a '+1 breast' figure had the values +1,0,0; a '−2 buttocks' figure had the values 0, −2,0; a '+1 leg' had the values 0,0,+1; etc."

How's that for hiding old fashioned curiosity under a blanket of expertise? Anything that can be made to resemble a mathematical formula is bound to be respectable.

Their conclusion? Suffice to say that large bust preference seems to be associated with a "Playboy image". And those whose choice lies elsewhere, as near as we can figure, should be ashamed of themselves.

■ Like the measles, good ideas have a tendency to spread. Take that trick Hydro has been using to discourage youngsters from climbing transmission line towers. It consists of coating the lower members of the tower with a heavy grease and, like many simple schemes, it works.

We have since heard of a YWCA hostel in England adopting the same technique. They've taken to greasing the drain pipes and guttering to protect the young damsels from peeping toms and ardent swains who refuse to accept a last goodnight at the front door.

It, too, appears to be effective and, while it isn't likely to save any lives, it could prevent a fate worse than death.

■ On the other hand, the Midlands Electricity Board seems to be taking the opposite tack. It's providing peeping toms with built-in facilities.

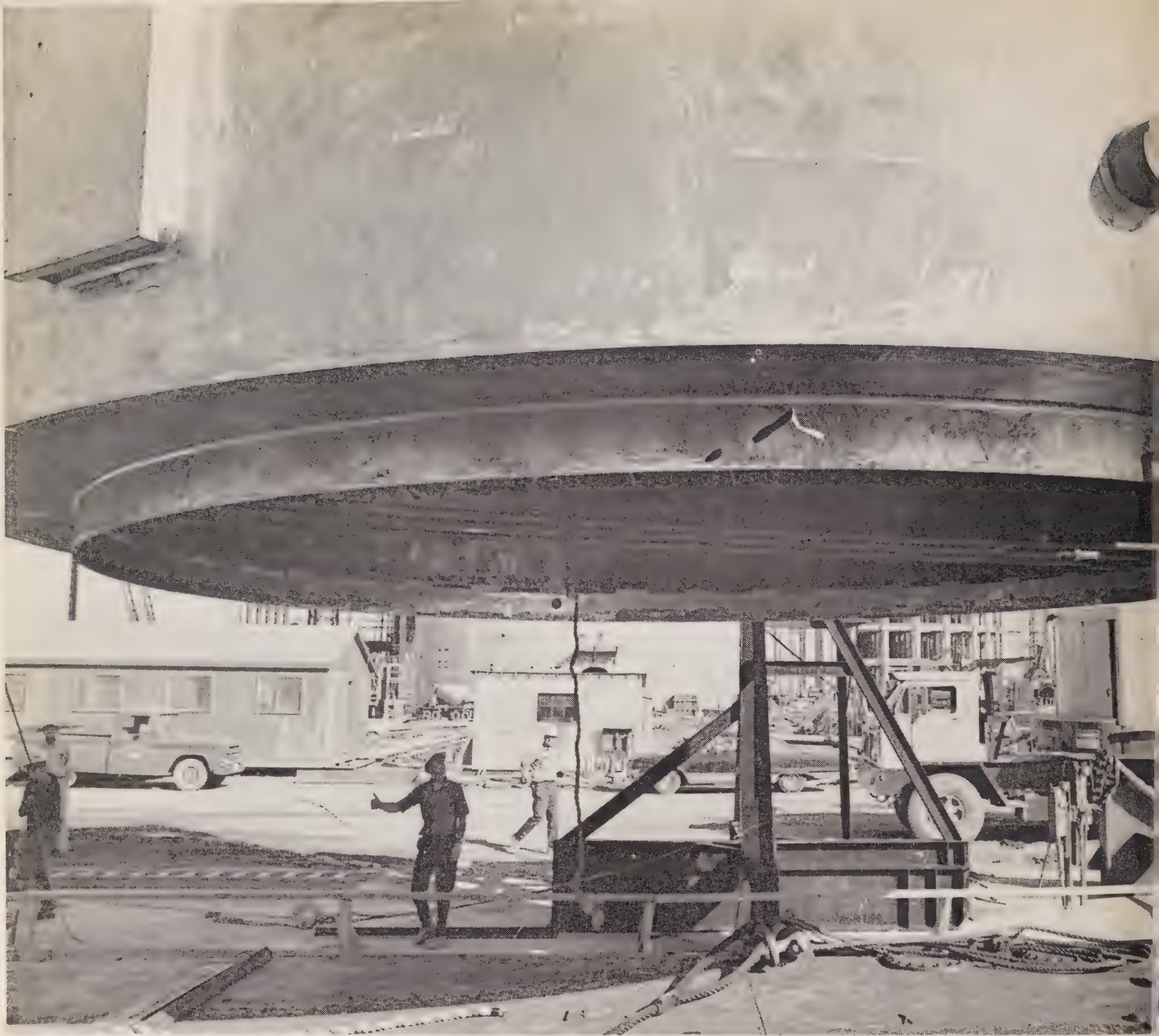
As described in the "Electrical Review", the builder of a new bungalow in Shropshire had been assured by the electrical authorities that a power pole on the property could readily be removed to make way for the house. So he commenced building around the pole. Word was later received that the power authorities would require a year's notice to move the obstruction.

As things now stand, the pole protrudes through the house and runs for part of its length through the centre of the bathroom.

While this might be a handy arrangement for hanging bath towels or for scratching an itchy back, the drawbacks would seem to outweigh the advantages. Linemen, for example, climbing aloft to repair insulators and the like, might be considered something of an imposition even if they did doff their caps in deference while passing through the bathroom area.

Fortunately, the electrical board recognizes an emergency when it sees one and, in a conciliatory mood, has agreed to "swing the wires on to the new pole fairly soon". □





**Follow the leader?** Not on your life, especially when it comes to size. Construction workers are dwarfed as they unload this 60-ton calandria shell at the Pickering nuclear power project, near Toronto. To keep costs down, Hydro has to think big. That's one reason why Ontario's electrical rates are still among the world's lowest. Electric power costs about the same today as it did 10 years ago. And there aren't many bargains around like that.



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Publications



- salaam to the atom
- winter workhorse
- iron tonic for temagami

# ontario hydro news

march/1969



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### the cover

What would a group of Canadian kids be doing here? They're the children of nuclear engineers employed at the Rajasthan Atomic Power Project, 600 miles from Bombay. See opposite for how India, with Canadian help, is moving into the nuclear age.

### editorial board

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## peaks and valleys

On a typical cold winter day the meters registering the level of electrical power demand in Ontario start to climb toward the end of the afternoon. Lights are turned on as daylight fades and thousands of housewives add to the load as supper is started. The power hungry factories, meanwhile, continue their demands on generating facilities.

Such a sequence placed an unprecedented peak demand on the Ontario Hydro system last December 16, when for several minutes power in the order of 10 million kilowatts was required. Fortunately, the system was ready and so far as the average consumer was concerned it was just another day; power was there when the switch was pressed.

Hydro must be able to supply instant power at maximum demand levels, even though peak demand may only be approached for short periods on a few days during the year. Because of the fundamental nature of its product, failure by Hydro to meet requirements could result in economic loss for its customers, inconvenience and even hardship. In other words, Hydro is charged with the responsibility of supplying electricity to anyone in the province who wishes to use it at the time it is wanted.

Because utility customers do tend to develop seasonal and daily use patterns, such as the one described at the outset, some direction must be imposed on these patterns to utilize generating and transmission facilities at periods of the day and year when they might otherwise stand idle or operate well below capacity. This is one of the objectives of Hydro's marketing program — a continuing endeavor which is entirely consistent with lower unit costs whether or not supplies are temporarily strained.

Electrical demands now and in the future will be characterized by peaks and valleys. Building up the hollows is one of the big challenges confronting Hydro. Marketing action or "load building" designed to reduce system "down time" contributes just as surely to lower rates as the more obvious measures such as research, data processing and automation.

Generation and transmission, of course, are only part of the story. Ontario Hydro and the associated municipal utilities have a very substantial investment in distribution facilities. And the fixed costs of supplying a home which uses electricity for everything from heating to air conditioning are not substantially greater than for a home where electricity provides only the lighting. Metering and billing are other such costs.

This concept is not always appreciated and sometimes gives rise to the charge "monopoly" and the question "why promote?" While Hydro and the municipal utilities do provide 90 per cent of the electricity sold in Ontario, they have no monopoly over other sources of energy. The Ontario consumer has several options which, though possessing different characteristics, provide energy for many domestic and commercial functions. For example, only about 60 per cent of the homes in the province use electric water heaters, and the saturation level of electric home heating is very much lower.

Competition for the consumer's energy dollar is vigorous and if Hydro were to cease striving for a share of the more remunerative market for electricity it would not be keeping faith with its customers who have a right to expect rates which reflect maximum effort across the whole range of utility operations.

Certainly this is not an economic philosophy peculiar to Hydro in Ontario. Rather, it is a fact of life recognized and utilized by utilities throughout North America and abroad. □



# INDIA

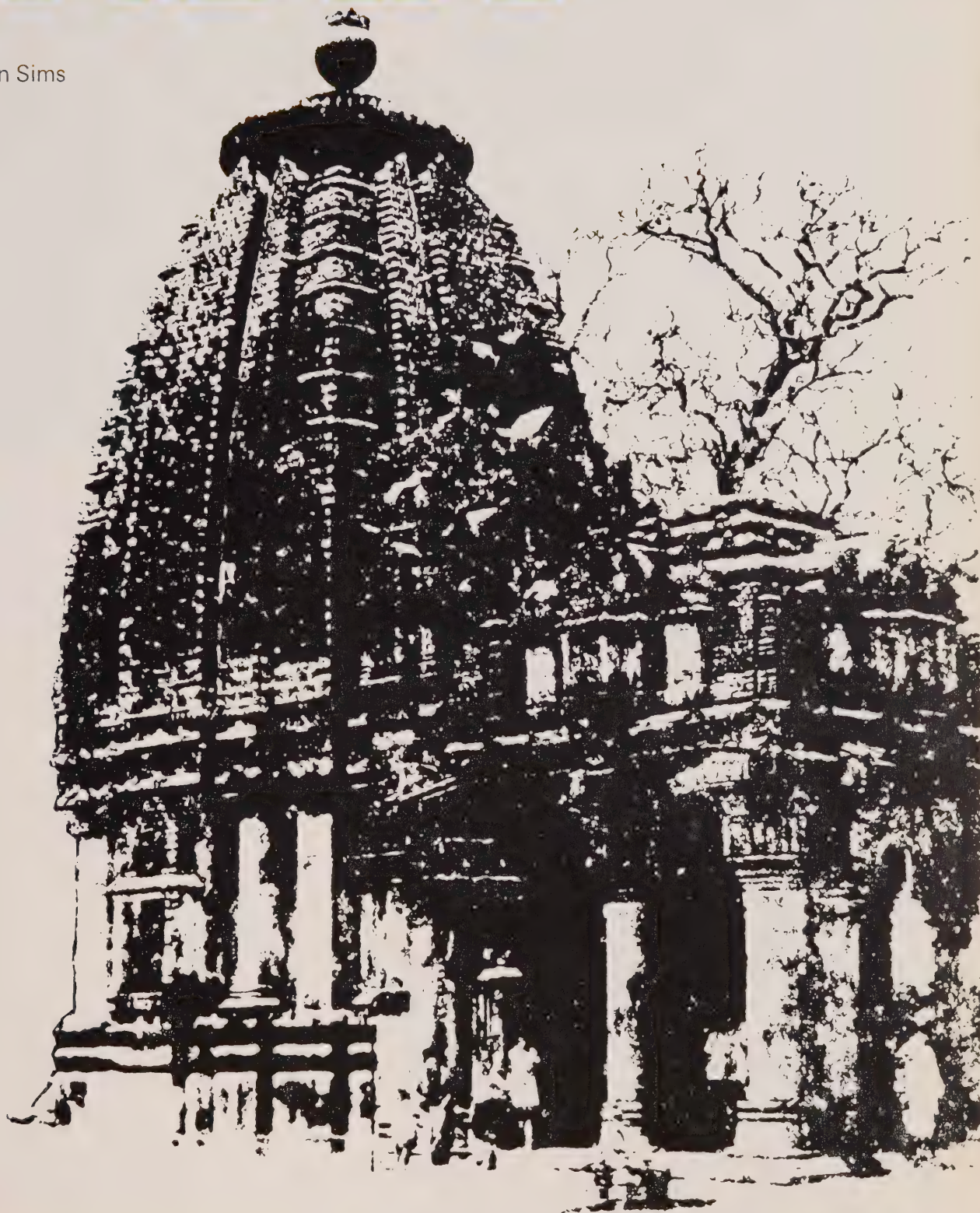
## enters the nuclear age

by John Sims

Nowhere is the contrast between western technology and the traditions of the east more evident. Sari-clad women, pans of stones balanced on their heads, form a human conveyor belt to carry away the rubble. Children play amid the debris and dust, oblivious of the historical significance of this arid plateau site.

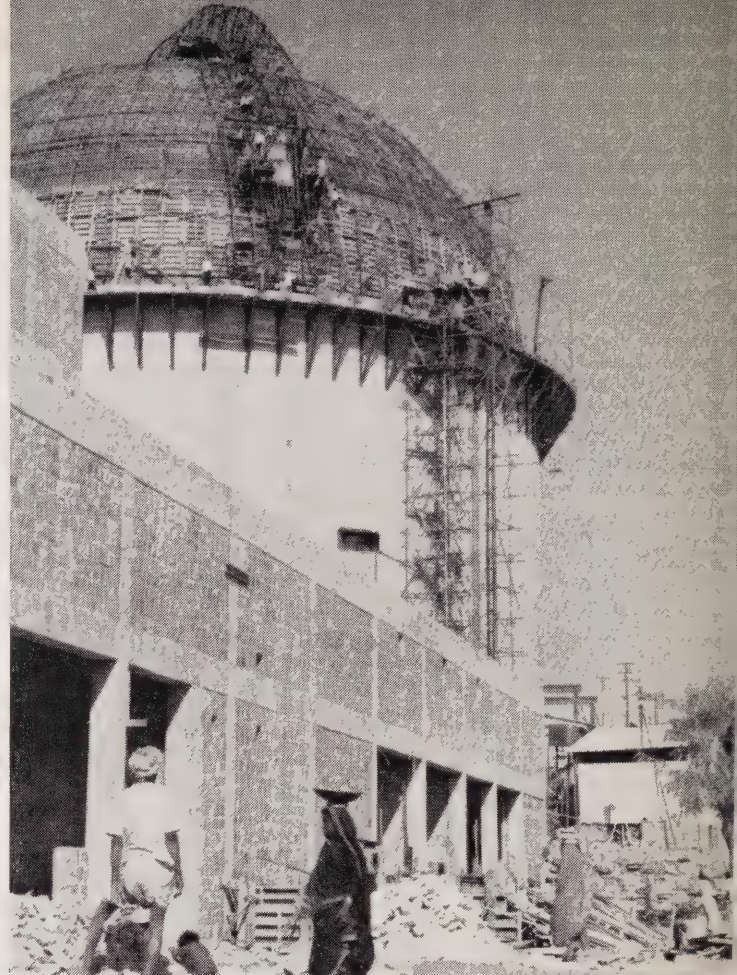
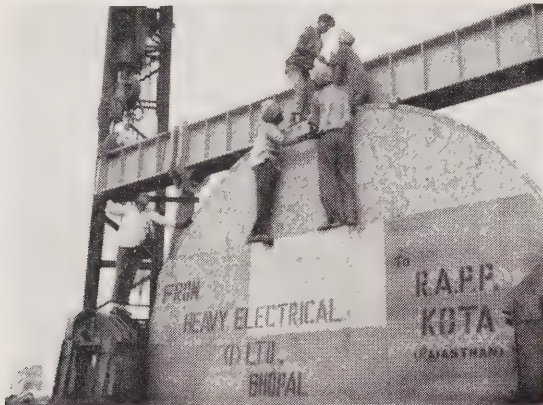
For here at Rana Pratap Sagar, about 600 miles from Bombay, India is moving — with Canadian help — into the nuclear age.

Canadian and Indian technology and a great deal of local muscle power are together





*A nuclear power plant grows, new homes rise amid the villages and temples of ancient Rajasthan.*



building a 400,000-kilowatt nuclear plant beside a reservoir already created for a neighboring hydro-electric development. The first of two reactors for the Rajasthan Atomic Power Project is already nearing completion; work on the second reactor building has begun.

Ontario Hydro will send a 23-man commissioning team to the Rajasthan project early next year. The first unit is expected to go into service later in 1970.

The commissioning team is being sent under an agreement between Hydro and Atomic Energy of Canada Limited, which is designing the nuclear part of the project. Hydro is providing specialists to oversee the commissioning and initial operation of the station and to prepare and co-ordinate a training program for Indian personnel.

"Our main aim is to help the Indians to help themselves," says Vern Austman, commissioning superintendent for the project, which is similar in design to Canada's first operational nuclear plant at Douglas Point, on Lake Huron. Under the Colombo Plan, about 50 Indian personnel have received training at Douglas Point and at Hydro's Nuclear Training Centre at Rolphton and the Nuclear Power Demonstration reactor next door.

Eleven Indian engineers who served during the commissioning of Douglas Point between 1965 and 1967 have returned home. Another group of engineers, operators and maintenance foremen will return this year.

"We will have the advantage of a well-trained operating group," says Mr. Austman. Six Indian engineers are now working at the AECL Laboratories at Sheridan Park on operating manuals and flow sheets for Rajasthan.

Nuclear fellowship between India and Canada began about 20 years ago when Canada offered help under the Colombo Plan for the design and construction of an experimental reactor close to Bombay. Similar to the NRX operating in Chalk River, the Canada-India reactor was operating by July, 1960, and is still one of India's main research facilities. Construction costs were shared by both countries.

India was highly interested in Canada's unique natural uranium and heavy water system — most reactors are fuelled with enriched uranium — when she decided to seek help in building an experimental

reactor. So it was natural to lean toward the same system for Rajasthan.

The conventional portion of the Rajasthan station — the turbine-generator building, other non-nuclear equipment — has been designed by the Montreal Engineering Co. The Indian Department of Atomic Energy is the prime contractor, using a local labour force of up to 4,000 men and women.

In about two months, the first unit will pass a major milestone: installation of the reactor vessel. Many turbine components are already on the site and the remainder is on the way from Canada.

As far as training is concerned, the Indian engineers spend about nine months at the Rolphton Nuclear Training Centre learning such fundamentals as radiation protection training and nuclear theory.

At Douglas Point, trainees take orientation courses on all the station's systems. The engineers are then fitted into regular shifts, positions relative to the posts they will hold in Rajasthan or other Indian nuclear plants. Others are assigned work at Sheridan Park or are attached to manufacturing and consultants engaged in the Rajasthan project.

Rajasthan is Hydro's first overseas nuclear





ignment although personnel and know-  
v have been provided for hydro-electric  
jects in eight other countries since 1960.  
6-man team is at present in Nigeria.  
ada, on the other hand, is involved  
ough AECL in another nuclear develop-  
nt in the Karachi area of Pakistan.

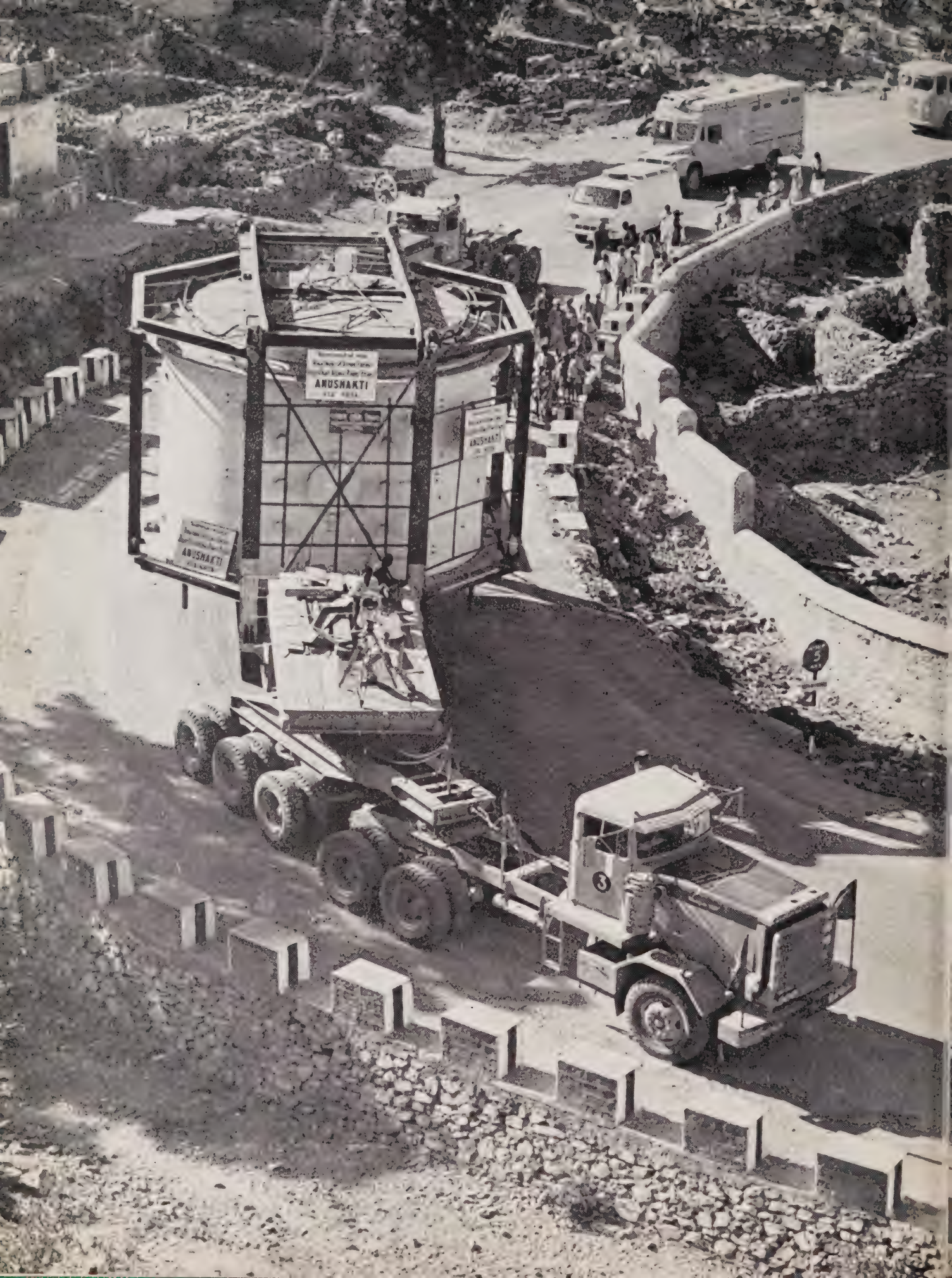
Austman visited the Rajasthan site  
out a year ago for a preliminary look.  
the moment, only a few AECL and  
ntreal Engineering personnel and their  
es and children are living there.

at kind of conditions can the Hydro  
n and their families expect? Canadian  
ilies will live in two-storey homes  
lt of fine granite-like Kota stone. The  
ises will have plaster interiors and ter-  
zo floors. Local furniture features  
nish-design teak. Wicker webbing  
aces upholstery, which is a bit too  
in summer temperatures that can  
ch 120 degrees.

hopping centre in the townsite is  
ctly Eastern in flavor with garage-type  
nt doors which open up for business. A









*Truck delivering huge reactor vessel negotiates tortuous mountain roads; men and women labor side by side at the site.*



school with a Canadian curriculum is already being attended by about 15 children.

Hydro has prepared its employees for the job by issuing a fact-filled booklet designed to lessen the cultural shock experienced by families settling in a new country. It contains maps, pictures, railway timetables, places to shop, and helpful hints on health care, food preparation and even etiquette.

For example, Hydro personnel are advised to avoid serving ham to Muslim visitors and steak to Hindus. To wives, the booklet says girdles are "unknown in India", and advises them: "Bring enough of your formal make-up to last the whole of your journey. Don't bother with the TV set."

For a Canadian-style Christmas, it suggests families bring artificial Christmas trees and gifts for the children. For men, fishing and hunting for small game are reported to be good but big-game hunting for tiger and leopard is "quite expensive".

The nearby reservoir provides a good spot for boating and sailing, but the guide adds this cautionary note: "Water skiing is not recommended as crocodiles have occasionally been seen in the area."

This predominantly agricultural area contains a number of small villages near the site and three small towns with populations up to 18,000 within 10 miles of the power station.

The Indian government describes the state of Rajasthan as "particularly backward" because of sparse rainfall and limited hydro-electric potential. It is rich in minerals, but major industries have not been developed because of its remoteness from coalfields.

The nuclear project will change all this, providing a tremendous boost for agriculture and industry which, in turn, will help increase employment opportunities and food production.

Already the construction phase has given jobs to thousands of unskilled and semi-skilled workers in the area. And when nuclear power becomes available, there will be a further need for skilled and technical trades in industries such as mining and chemical and fertilizer production.

India has the most advanced nuclear power program among the world's underdeveloped countries. But a great deal of work lies ahead for not even one-tenth of her 650,000 villages, which house 85 per cent of the population, are electrified. In

addition to the Rajasthan project, there are nuclear stations in various stages of construction at Tarapur, 80 miles north of Bombay, and Kalpakkam, 55 miles south of Madras.

A small heavy water plant has been operating since 1962 in Nangal and a 100-ton plant is planned near the Rajasthan project.

India is also manufacturing its own nuclear fuel and has an active uranium exploration program. A mine in Bihar is being developed with a uranium mill to treat 1,000 tons of ore a day.

Some of the major components for its nuclear plants were manufactured in India and the India-made content is expected to increase in future projects. For example, the import content of the new Kalpakkam station is expected to be less than 20 per cent, compared with about 60 per cent at the Rajasthan project.

India has offered to give whatever assistance it can to underdeveloped countries by lending the help of its technical experts or by sharing its own experience. Thus Hydro's assistance may well have far-reaching effects outside the borders of the Indian sub-continent. □



Delegates from every sector of the electrical industry attended the Ontario Electrical League's ninth industrial conference in Toronto. Switched from a traditional November date, the conference coincided with National Electrical Week and the league's annual meeting. A top cast of characters and a lively format enabled the event to live up to its theme. . . .

## in step with the future

### the knowledge explosion

"Education is the means by which man learns to live with change. It is the accelerator that helps you and me match the swiftness of change," consultant Thane Crozier told delegates.

Mr. Crozier showed a graph that illustrated how the accumulation of knowledge had grown from a gentle curve to become what is now almost a vertical line. In the last 100 years, man has been riding the crest of this knowledge explosion, he said.

"We live in an age of adventure. An age of opportunity. An age of influence. This period of time has witnessed technological advancement, industrialization, urbanization to mention only a few significant developments. Education has been the catalyst associated with man's recent progress," he added.

Ontario, said Mr. Crozier, is Canada's most industrialized province and leads a country that spends more of its national revenue on education than any other nation in the world. The electrical industry was caught up in this "revolution" through the thrust of technological change.

He told delegates that education patterns in Ontario are growing in three directions. Firstly, the base is broadening through natural increase in the population and immigration; secondly, vertical growth is occurring as more students remain in school for longer periods; thirdly, there is a lateral growth resulting from the fantastic increase in educational facilities and pro-



grams — more avenues of learning are opening up.

"The vertical growth helps explain why the electrical industry, like Canadian industry in general, is having difficulty in attracting adequate numbers of high school students — let alone high school graduates," he said.

Industry and business were beginning to play a new role in education. Academic-industrial relationships and objectives were being linked closer together through such vehicles as community colleges and adult training programs.

The speaker made several suggestions for organizations in the electrical industry. Included were the need to lick educational apathy; consideration of education and manpower planning as an integral part of short and long-term planning; the development of progressive tuition aid policies and appropriate internal financial budgets; and the support of educational objectives by industry associations. □

### a \$500 million challenge

"Front Page Challenge" moderator Fred Davis didn't keep delegates guessing long as to his part in the program.

"We are going to talk about some big figures, some possibilities, some plans and the steps taken to implement them and throw out a few ideas by which each of you can increase your share of a largely untapped business market."

Flashing a figure of \$500 million on a

screen, Mr. Davis said that was a large amount of business waiting for enterprising electrical contractors who wholeheartedly solicit and promote electrical modernization."

He pointed out that right now in Ontario there are over one million single family homes over 20 years old and in need of electrical modernization. And the average revamping job is pegged at \$500.

Mr. Davis then launched into a description of where older homes can be modernized and showed "before" and "after" color slides of remodelled older homes. Electric heating, water heating, indoor and outdoor lighting and built-in appliances were featured.

Speaking for Ontario Hydro, the co-moderator said the Electrical Modernization finance plan was created to bring the home-owner and the electrical contractor together — "to help you sell safe, efficient, convenient and adequate electrical systems."

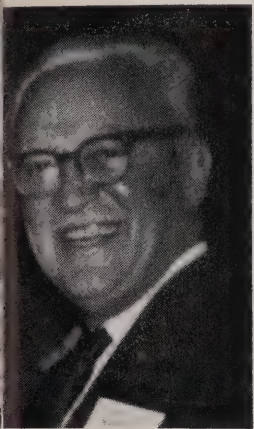
He said the plan covered all existing single family dwellings and farm residences, some small commercial establishments, not summer cottages. The type of work that can be done under the plan ranges from new service entrances to plumbing needed to install a built-in dishwasher, as long as 75 per cent of the modernization job is electrical.

"I think you'll agree it's a good plan that should help you cut yourself a slice of the \$500 million electrical modernization market."





Segments of the electrical industry went on trial under "Judge" John Moles for being out of step and making the public suffer, while a panel of experts discussed performance standards.



Honored at the conference with gifts and a luncheon was Harry J. Foy, centre photo, who retired as OEL assistant manager after 40 years in the industry. Newly-elected OEL president Peter Thompson, of Northern Electric, chats with Ontario Trade and Development Minister Stanley J. Randall and Ontario Hydro Chairman George Gathercole.

Mr. Davis said Ontario Hydro was embarking on a promotional campaign to create consumer interest, since "an informed public is basic to any merchandising scheme."

Included in the plan were advertisements in 43 daily, 206 weekly and 11 foreign language newspapers; on 58 radio stations, TV stations and two national magazines. Funding it out were 260 billboards in 35 different areas.

For the contractor, there was a kit which explained the program in detail and supplied direct mail flyers, household mailers, brochures and other promotional material. Mr. Davis then told of the minimum and maximum loans of \$100 and \$2,000 with a down-payment of 10 per cent. "The entire theme is non-profitmaking and the interest rates are adjusted from time to time to ensure a no-profit position for Hydro," he explained.

However, he stressed that the plan was only a selling tool "as valid and important as your business as a pair of side cutters or a screwdriver. And — like most tools — it's only as good as the man using it."

## Education: computer provides the answers

One-third of the conference delegates constituted a representative sample, the electrical industry is doing pretty well educationwise.

A computer analysis of the educational background of about 200 delegates showed that 26 per cent had attended university — more than five times the national average. Another 43 per cent had attended high school, about three per cent below the national figure, while 14 per cent had attended Ryerson Polytechnical Institute, or its equivalent.

In the industrial category, over half the sample group came from electrical utilities. Twenty-three per cent were contractors, 17 per cent represented manufacturers and the remainder was split between distributors, architects and consultants.

Education didn't stop when the group entered the working world. Seventy-five per cent had taken courses outside working hours, while 65 per cent had taken classroom training during working hours in the last five years. Three-quarters of the sample felt they should get more on-the-job training and 59 per cent felt they should have more formal classroom training. In three out of four cases, the employer had helped to pay for night school courses. □

## new niagara born every nine months

In this Electric Age, utilities across Canada are adding the equivalent of a new Niagara Falls every nine months to the nation's power resources, said Ontario Trade and Development Minister Stanley J. Randall

at the OEL's annual dinner.

He said that in meeting the technological and social demands of the day, which had become increasingly dependent on electric power, "almost 3,000,000 kilowatts of new generating capacity were added to Canada's power pool last year, the biggest annual increase in history.

"Ontario adds the industrial muscle to Canada's strength, which rests in a combination of abundance and variety of natural treasures. To utilize this treasure, we must continue to march into the nuclear age and bring to the people of Ontario the many benefits of energy — electricity in abundance at low cost, abatement of air pollution, utilization of our rich uranium resources, the broadening of our technological expertise and the stimulation of new manufacturing industries and markets for our products," he added.

Mr. Randall noted that the conference was held during National Electrical Week and coincided with the celebration of the 122nd anniversary of the birth of Thomas A. Edison. He said he had read that when Edison was in school, he was always at the bottom of his class — teachers called him stupid, doctors predicted he would have serious brain trouble.

"To paraphrase Winston Churchill in another context — 'some stupid, some brain trouble', Edison left us 1,097 patents and I'm sure he would be pleased to know we are still using many of his inventions and are also using his name to inspire future scientists, engineers and inventors." □



# the iron robot

by John Hunt

## **wolves play peekaboo at north america's most automated mine**

Just 65 miles north of North Bay, the village of Temagami has been a tourist paradise since the turn of the century. In the summer Temagami Lake swarms with boats, while the local airline is kept busy flying fishermen and supplies to distant camps and resorts.

With more than 2,500 miles of shoreline, 700 cottages and commercial camps, and 1,240 islands, Temagami Lake is one of Ontario's great tourist centres, attracting hundreds of visitors from the US every summer.

Now Temagami's economy, long based on tourism and lumbering, has received a shot in the arm with the opening of the \$50 million Sherman Mine, producing one million tons of iron pellets a year.

Sherman was officially opened last September by Ontario Prime Minister John

Robarts. It is an open pit operation in which the iron ore is blasted, loaded into huge trucks, then converted into pellets which are shipped south to the Dominion Foundries and Steel Limited's mills at Hamilton.

The mine employs about 300 people and at one time during construction there were more than 600 on the job. An influx of this type into a tourist area could easily have caused a great deal of disruption, or lasting damage. Instead, by careful planning, co-operation with government agencies and with the aid of a host of experts in many fields, Sherman Mine became an asset to the entire area.

The vast Temagami iron ranges, which contain enough ore to supply the Sherman Mine for more than 35 years at the present rate of production, have been known for more than 70 years. But the availability of iron ore closer to the steel mills, the glamor of the Cobalt silver fields and

the gold of Kirkland Lake and Timmins attracted most prospectors and developers further north, leaving Temagami to slumber undisturbed.

This 70-year gap may work to Temagami's advantage – the mistakes of unplanned mining towns and widespread pollution are being carefully avoided there.

Sherman is a joint venture of Dominion Foundries and Steel Limited (Dofasco), controlling 90 per cent of the property, and The Cleveland-Cliffs Iron Company, of Cleveland, Ohio, through a wholly-owned subsidiary, the Tetapaga Mining Company with 10 per cent of the ownership.

Cleveland-Cliffs is one of the oldest iron mining companies in the United States, and is responsible for the management and operation of the Sherman Mine. Dofasco after whose late president, Frank A. Sherman, the mine is named, is one of the giants of the Canadian steel industry.

When the decision was reached nearly six years ago to develop the Temagami iron





es, a tremendous research effort  
an in Canada and the US. The 7,200  
s of the Sherman property had to be  
fully mapped and tested to outline  
ize and location of the ore bodies. Bulk  
ples were sent to research laboratories  
e United States to determine the best  
ods and techniques of pelletizing.

etizing, which has revolutionized the  
industry, consists of taking the crude  
removing the greater part of the  
e rock, and turning out pellets of  
ore running around 63 per cent iron.  
pellets are about the size of a child's  
, and can easily be handled and  
ported.

pellets are hauled in three unit trains  
h run around the clock between  
ilton and Temagami. The trains were  
ially designed for the Sherman Mine  
uilt by the National Steel Car Com-  
y at Hamilton. The covered ore cars  
n automatically as they move beneath

the loading chute at the mine, and close  
automatically when the car is full.

One of the first jobs to be done at the prop-  
erty was building a railway spur line ;  
then Ontario Hydro ran a 115,000-volt  
transmission line to the site.

All merchantable timber was cut and  
salvaged in co-operation with the Ontario  
department of Lands and Forests. The  
mine uses about six million gallons of  
water each day in its processing plant,  
and has to dispose of about 2,500,000  
tons of finely ground waste rock each  
year. This could have easily caused a  
terrific pollution problem but the company  
worked closely with the Ontario Water  
Resources Commission from the outset.

A small lake — one in a chain of four —  
was drained after all game fish had been  
netted and removed. Then a noted hydrolo-  
gist, Professor J. O. Osterberg, of North-  
western University, Illinois, designed a dam  
to hold back the waste rock. The water  
which transports the waste recirculates

*Silhouetted against the evening  
sky, the Sherman Mine  
emphasizes the emptiness of  
the northern wilderness.*





through the chain, and is so pure at the end of the process that it is used for the mine's drinking supply. One advantage over other types of mining operation is that iron can be removed magnetically and there are no chemicals in the waste.

The complex process of turning crude ore into iron pellets starts at the open pits, which will eventually go down 400 feet or more. There, drills with bits up to 12¼ inches in diameter bore down 45 feet, and the holes are packed with explosives. Two hundred thousand tons of crude ore are broken with a single blast.

The broken ore is loaded by electrically powered shovels, supplemented by a front-end loader that is the biggest of its kind in Canada. Then it is transported to the primary crusher in 65 and 85-ton trucks.

The broken ore, some of it as big as a man, is crushed down to about seven-inch size, then transported by conveyor belts to the concentrator plant. Here

it goes through giant mills until it is reduced to a fine powder that will go through a screen with 325 holes to the linear inch.

The iron is separated magnetically, then the concentrate is mixed with bentonite clay and fed into a balling drum which, by rotation, turns the black mixture into soft round pellets. The pellets are then fed into a rotating kiln, 114 feet long, with temperatures of 2,400 degrees, and converted into hard iron pellets that can be shipped to the steel mills.

A minor mystery to the layman is that the baking process converts the magnetite ore into non-magnetic hematite, one reason for the specially designed ore cars at the Sherman. The railway tracks leading to many pellet plants in the US and Canada are covered with pellets that have dropped from ore cars, and being nonmagnetic there is no economic method of recovering

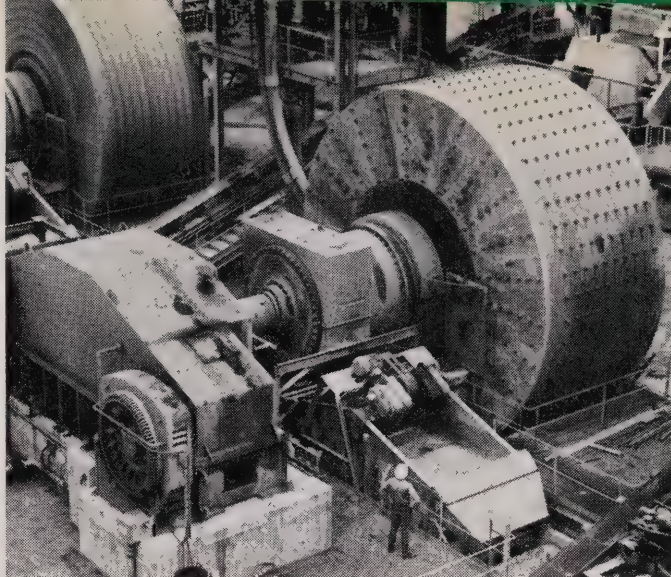
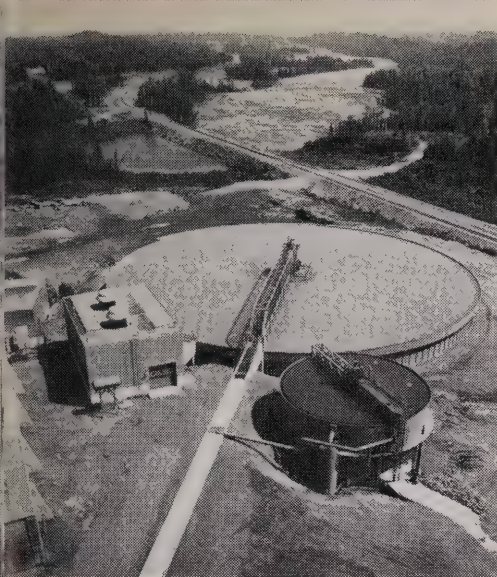
them. But the Sherman's cars are designed so that not a pellet is lost, rather to the annoyance of small boys who find them ideal, if deadly, ammunition for a slingshot.

The mine is the most highly automated of its kind in North America, and at the heart of the entire process is the central control room. Here three walls are covered with flashing lights, buttons, and TV screens, all under close observation by a handful of operators.

Electric power plays a key role in production. It's used by more than 400 electric motors, ranging from twin-coupled 1,500-horsepower giants that drive the ball mill to tiny 1/60th horsepower motors used on some instrument controls.

Aerial transmission lines also carry power to the open pits where trailing cables supply the giant shovels. Every critical process in the concentrating and pelletizing plants is watched by one of eight close-circuit TV cameras. One camera, with a





ot-treated lens and air-cooled motor,  
ers into the heart of the kiln.

the Sherman Mine has made a sizeable  
impact on the economy of the entire  
area, from North Bay to the tri-towns of  
Ilw Liskeard, Haileybury and Cobalt,  
some 30 miles north. For many years  
young people in the area have had to go  
north to find good jobs, but the Sherman  
is providing employment for men in  
many different occupations.

The pit and shop maintenance departments  
keep a fleet of 70 mobile and semi-mobile  
pieces of equipment in top condition. The  
purchasing department maintains a million  
dollar inventory. Laboratory technicians  
work around the clock checking the  
quality of pellets and providing analysis  
before fed into the concentrator. Electronic  
experts maintain the sophisticated instru-  
mentation while office staff use a computer  
aided with even bigger computers at

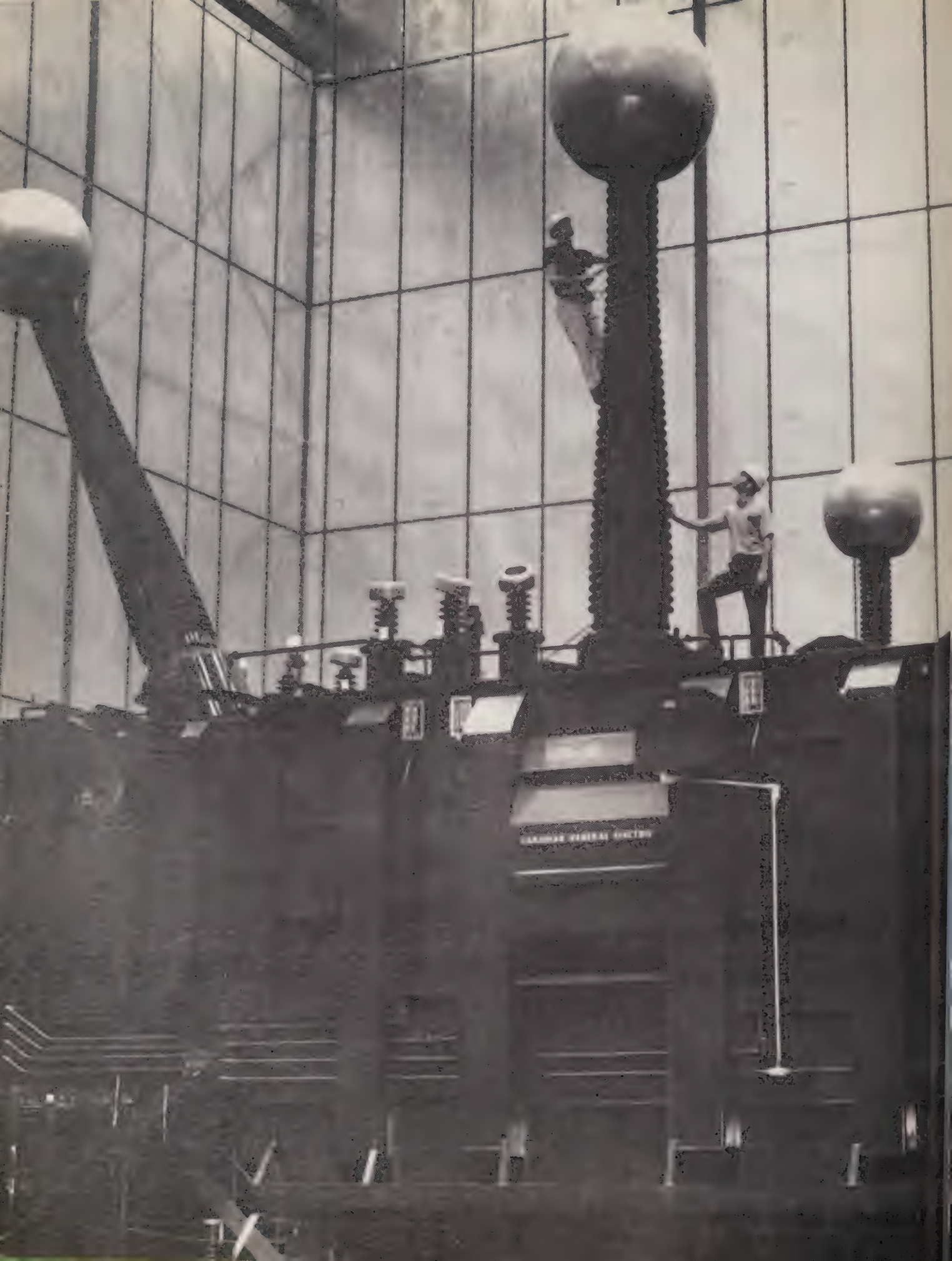
Cleveland-Cliffs' offices at Ishpeming  
and Cleveland.

Just four miles north of Temagami, the  
Ontario department of Municipal Affairs  
has designed a model townsite which is  
attracting a considerable number of em-  
ployees. Temagami and the surrounding  
area was incorporated last year as an  
Improvement District, providing the first  
municipal government known to the area.  
And the Sherman Mine is offering  
financial assistance to employees building  
their own homes in the Improvement  
District.

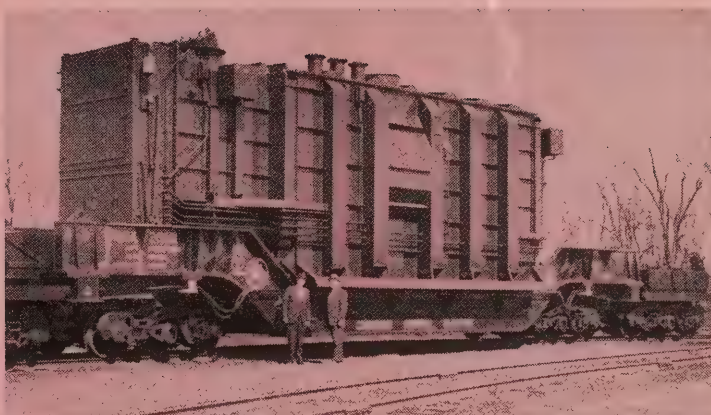
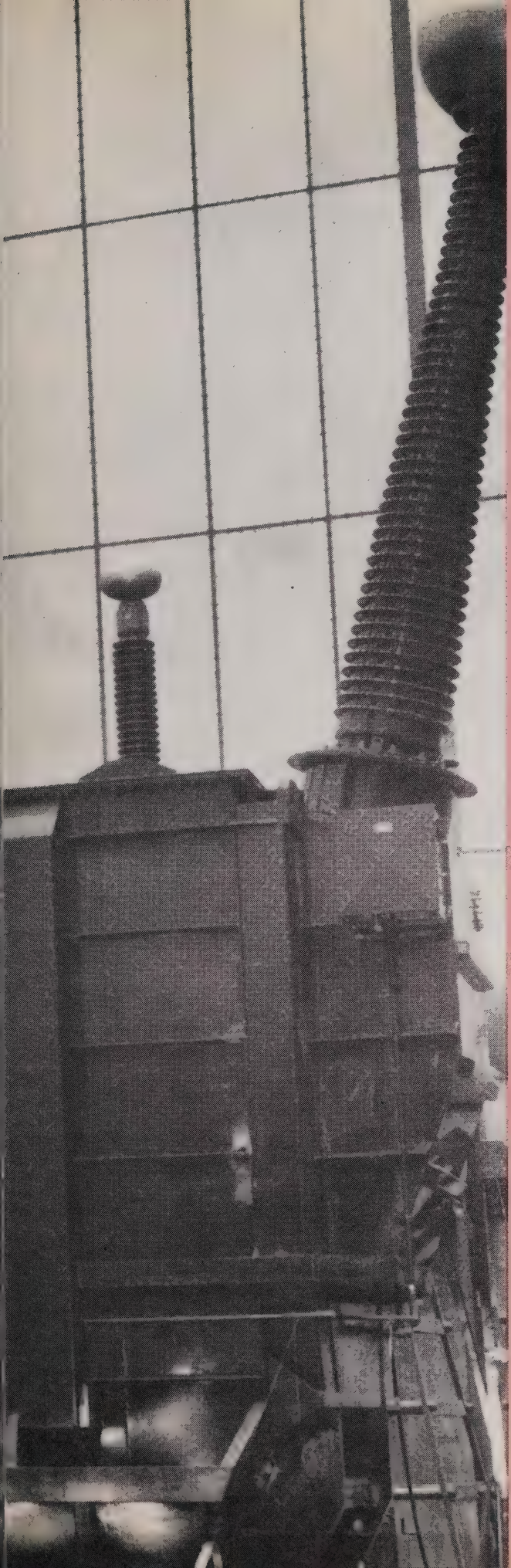
The Sherman Mine is an example of modern  
technology, but wolves still sneak out of  
the bush to watch operations in the open  
pits, and truck drivers have to watch out for  
wandering moose. And, in terms of  
seniority, the No. 1 man at the Sherman  
is Bob Turner, born on the Indian Reserve  
at Bear Island in Lake Temagami, who has  
given up guiding and trapping for year-  
round employment at the mine. □

*Scenes at the Sherman Mine  
show electrically-powered  
shovel in action, the large  
tailings thickener tank and one of  
the huge mills that cause the  
ore to tumble and crush itself.  
Unit train was designed specially  
for the mine.*









# spiky load for porcupine

Meet a transformer. All 300-odd tons of it. And while it may look cumbersome under assembly at the Canadian General Electric plant at Guelph, this transformer was built for travelling.

Its destination was Ontario Hydro's Porcupine transformer station, 450 miles away at Timmins. Hydro engineers and the manufacturer made allowances in the design for the trip.

They calculated the clearance of railway bridges, signal towers and overhead wires and also took into account the shape and size of the transport equipment — a 12-wheel depressed flatcar.

The Ontario Northland Railway designed the flatcar specially for the job. Railway officials say the transformer is the largest piece of equipment they have hauled. Together with the transformer and four flatcars of equipment, the train was able to reach a speed of 20 miles an hour.

Once the transformer was moved into place on its concrete foundations, the huge insulators and other parts were reattached and the whole thing topped up with 31,000 gallons of insulating oil.

Two such transformers — each costing about \$268,000 — are being installed to make an inter-connection with the 500,000-volt transmission line that carries power south from hydro-electric stations in the James Bay area. □





# the snow horse gallops in

by Bill Smith

Temperatures dropped to 62 degrees below zero. Winds blew up to 50 miles an hour producing a chill factor of minus 145 degrees. Rough ice and open water were just some of the obstacles faced.

Yet the first surface expedition to reach the North Pole since Admiral Robert Peary's epic trip in 1909 accomplished the 830-mile roundabout trek last year from Canada's Ward Hunt Island to the northernmost point on earth in just 43 days.

The four-man expedition was led by insurance man Ralph Plaisted, of St. Paul, Minnesota. And its phenomenal success was almost entirely due to a form of transportation made for just those appalling conditions — the snowmobile.

Each year, thousands of Canadians discover the delights of winter travel with the comfort and mobility of these remarkable machines. More than 50,000 will be sold here in 1969 as increasing numbers of cottagers and city dwellers take to the snow trails.

But, as the Plaisted expedition proved, the snowmobile is growing up. From British Columbia to Newfoundland, it is fast replacing tractors, four-wheel drive vehicles and even horses as winter's beast of burden.

Business and professional men are finding that the durability, mobility and economy of these machines make them ideal for many winter tasks. Surveyors deep in the bush, for example, have found they speed up the work while farmers use them to bring in the cows and perform numerous other chores when roads are snow-clogged.

James Keller, top hand on a 20,000-acre cattle spread at 100 Mile House in British



umbia, has added an "iron horse" to his  
uda. The former Kirkland Lake resident  
s a snowmobile to ride the range  
oughout the winter months.

he movies, Canada's mounties patrol  
frozen north by dog sled. But in  
life the RCMP, like their counterparts  
the provincial police forces, are switching  
the motorized toboggan for many tasks.  
St. John Ambulance crews in two  
ario centres — Orillia and Peterborough  
recently became the first in Canada to be  
ipped with motorized toboggans for  
at snowmobile meets and as an aid  
ki patrols.

untry doctors have found snowmobiles  
valuable; ice fishermen use them to tote  
r shanties; hydro crews use them to  
rol lines; game wardens, Labrador  
sionaries and even Eskimos are turning  
his ubiquitous machine.

boon that the motorized toboggan has  
n to such resort areas as the Muskokas,  
Kawarthas and the Highlands of Hali-  
ton can be judged from the number of  
rist operators who have found it prof-  
le to remain open for the winter season.

or seven years ago only a few thousand  
wmobiles were sold annually, probably  
y 4,000 or 5,000 in Canada. This year  
s in North America are expected to  
eed 180,000.

ustry spokesmen credit two factors for  
sport's rapid rise in popularity. First of  
somewhat of a recreational vacuum  
ts during the long winter months when  
ple tend to stay indoors and grumble









thing if not versatile, the snowmobile is equally at home on a country road or an expedition to the North Pole (right). A water-borne version already proving popular. Bottom photo shows production line at the Waterbury plant of Outboard Marine.



about the weather. However, many are discovering that winter not only can be tolerated — it can be enjoyed. The second important reason is that snowmobiling in most cases is an activity in which the whole family can participate.

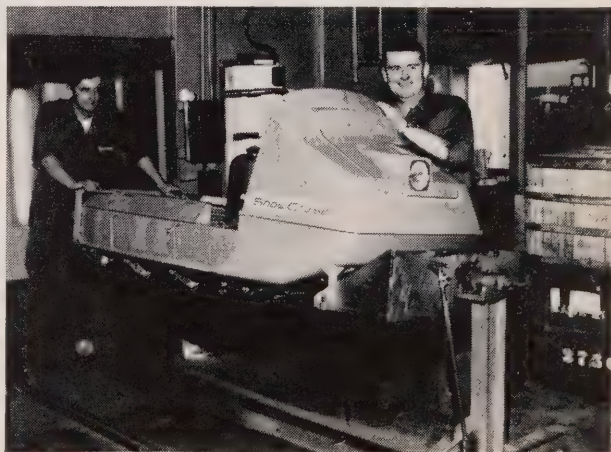
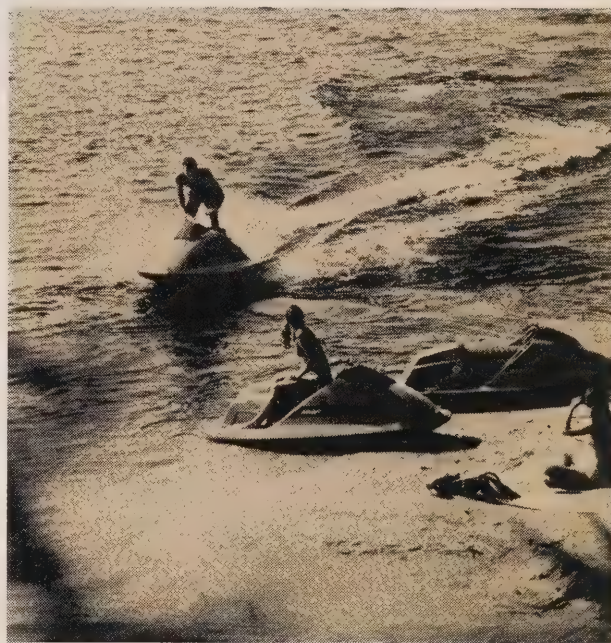
Snow safaris, both day and night, have proven popular with the snowmobile set, but uses for snowmobiles are as varied as the imagination of the people who own them. Racing is undoubtedly the most popular organized sport for spectators and entrants alike. One of the longest is the 500-mile international race from Winnipeg to St. Paul, Minn. This marathon thoroughly tests the endurance of both machine and driver.

The snowmobile traces its origins to the ingenuity and determination of a French-Canadian with a gift for mechanics. A series of inventions by the late Joseph-Armand Bombardier led to the founding of Bombardier, Ltd., and to the mass production of snowmobiles in the village of Valcourt, Que., in 1959.

It was in the 1920s, that Bombardier developed a sled steered by skis and powered by an airplane propeller, but this machine was not the ultimate answer.

A snow-caused tragedy led to the development of the first successful mass-produced snowmobile generally considered a vehicle for fun. One of Bombardier's sons, stricken with appendicitis, died because the roads of rural Quebec were choked with waist-high snow, blocking access to medical attention.

From that tragic day in the early 1930s,







## tobogganing to trouble

Reaching downed lines and iced-up insulators is a perennial problem for Hydro crews, who over the years have resorted to everything from snow shoes to ski-equipped automobiles to get them through deep drifts. Horses were the earliest and most reliable form of winter transportation and the stables at Cameron Falls generating station, on the Nipigon River, still stand, although they're now used as a carpenter's shop. In the late 1920s at least one Model-A Ford was chugging around on skis. This was followed by a family of large tracked snow-going vehicles capable of carrying a dozen men. However, the versatility of the contemporary snowmobile — or motorized toboggan as Hydro's transportation people prefer to call it — made it an immediate candidate for winter surveying and linework. The basic fleet, which is stationed at the Ontario Hydro Service Centre in Etobicoke, has leaped from around ten in 1964 to nearly 100 vehicles. Thirty-two of these were added this winter. Maintenance and any modifications are performed at the central depot, but the machines are distributed to Hydro personnel across the province.

In addition, it is estimated that Hydro's seven huge geographical regions operate at least that number of machines of their own. Backbone of the Hydro fleet is a twin-track, single-ski snowmobile particularly suited to deep snow. It is capable of carrying two or three people while dragging a transmission pole along a right-of-way. One disadvantage is its weight — if it does get stuck, it is hard to extricate. A lighter single-track, twin-ski model is used by such people as survey crews and supervisory personnel.

"We estimate that snowmobiles are needed 60 days a year in the northern parts of the province," says George Morton, of Hydro's transport and work equipment section. "Of course, this pretty well rules out the Toronto area, although one time last year we rented out about a dozen to enable crews to work on the steel tower line between Toronto and Hamilton after a bad ice storm."

Hydro crews are well briefed on the potential hazards of snowmobiling. Regulations have been drawn up to ensure they're wearing adequate clothing and also to promote travelling in pairs in case one machine should break down.

"Travel is so easy that a driver tends to forget how far away he is from home. And it can be a long, cold walk out of the bush," says Mr. Morton. □

Bombardier vowed to perfect a machine that would traverse all kinds of snow.

This slight, scholarly and self-effacing man was born in 1907 in Valcourt. In his youth, winter was a sentence of imprisonment. There were places to go, but getting there was another problem. Bombardier spent many hours pondering the possibility of creating a vehicle that would skim the snows. But it was 1936 before the inventor, then 29, succeeded in building a machine with commercial possibilities. That prototype, with its sprocket-and-track assembly and floating suspension, was the forerunner of today's varied family of Bombardier snow vehicles.

But where could such a machine be sold? Bombardier was French and practical. He did not slave away merely to amuse himself. It was essential he find a market for his brainchild.

The Canadian Army provided part of the answer in 1939. Bombardier and his staff were asked to develop a light armored vehicle that could be used on snow. The result was the Penguin, a vehicle that sloshed its way through the campaign in the coastal marshes of Holland. Meanwhile, demand stepped up nearer home. Word had leaked out that the snowmobile was a far better answer than either dog team or snowshoes.

By 1942, Bombardier Snowmobile Ltd. was in existence and the inventor had already turned to the problems of forestry operators in deep winter. He developed a type of snow tractor which effectively put the traditional horse-teams out of the bush. It's still in use today.

Growth in the snowmobile industry within half a decade has been phenomenal. Several small snowmobile companies in the United States Midwest introduced vehicles in the 60s. They were followed by much larger firms such as Outboard Marine, of Peterborough, which has just expanded its operation with the completion of a 120,000-square-foot building on the outskirts of the city.

Sales of all snowmobile companies — roughly 40 in number — have zoomed fantastically in the last five years. Accurate figures are difficult to obtain and even marketing experts are reluctant to commit themselves. However, it is conservative to infer that the total number of such vehicles in use by the end of the 1968-69 season will approach 300,000.

Snowmobiles seem destined to stay around wherever there's snow. Or even where there's not. For snowmobiles have been successfully operated in the Sahara Desert, while a water-borne version promises to be equally, if not more, popular. □





*W. Darcy McKeough, Ontario Municipal Affairs Minister, draws rapt attention during his regional government talk.*

## boundaries for the space age

Regional government was the chief topic and it drew a record 160 delegates to the recent District 5, OMEA meeting at Niagara Falls.

Highlight of the one-day program was a speech by W. Darcy McKeough, Ontario Municipal Affairs Minister, who focused attention on the Niagara peninsula where a new system of municipal government will come into effect next year.

Mr. McKeough reiterated general guidelines for the re-organization of Lincoln and Welland counties, which will see the present 26 municipal entities reduced to 12 with a region-wide administration at the top. There will be four cities, six towns and two townships. Elections for the new governing bodies are scheduled for September, with preliminary operation beginning the following month.

Mr. McKeough said the new structure was compatible with the space age and

replaced a system created over a century ago. "That the present system is working at all," he said, "is a tribute to the people who have served in municipal government."

The concept of town and country being two separate entities is gone, said the Minister. But planners of the 19th century couldn't foresee the immense changes, particularly in the movement of people.

Borrowing a phrase from Marshall McLuhan, he described present life as that of a global village. "People, whether they live in town or country, want equal services — education, hydro, water and all."

He said that in the short run some people would feel they were better off without regional government. But in the long run, it would be better for all. The aim of the revision was to accomplish "the greatest good for the greatest number of people".

One of the advantages to a broader-based government, said Mr. McKeough,



**'regional  
government  
will work  
only if  
people want  
it to work'**



*Receiving 15-year long service awards from OMEA president J. R. Phillips were W. E. Stetler, left, Delhi, and H. W. Walker, Welland.*



*Elected to head District 5 for the coming year were : Seated, W. Sam Jennings, first vice-president, Niagara-on-the-Lake; Andy Frame, president, Burlington, and Stuart J. Chapple, second vice-president, Stoney Creek. Standing, George Butcher, Simcoe; Lorne Reeder, St. George; Arthur Bennett, past president, St. Catharines; D. Gordon Robertson, Lynden; and Sidney A. Baldwin, Ancaster.*

was the economy of scale. He singled out computers as an example, saying it was doubtful whether one utility in the Niagara peninsula could justify the purchase of such a machine, but utilities in the region as a whole probably could make good use of it.

Answering questions from delegates, the Minister said that there was now a three-man team from his department visiting municipalities in Lincoln and Welland to "sort out problems which hadn't necessarily occurred to us". The results would then be "boiled down" in consultation with the regional people concerned.

Since the provincial government had an open mind on Hydro service, the municipal electrical systems fell into this category. Negotiations would have to take place and if no definite pattern had developed by January 1, commissions would probably

still continue to function in their present form after that date.

Mr. McKeough warned delegates that "regional government will only work if people want it to work".

Earlier in the meeting, the group heard a comprehensive report on marketing. D. Gordon, Ontario Hydro's assistant general manager — marketing, spoke about marketing over the last decade and gave a broad picture of the future. He also gave reasons why, despite the low margin of reserve, the Hydro family should continue its promotional campaign.

Don Ramsay, director of sales for Ontario Hydro, told delegates about market trends and where the use of electricity could be best pursued. Advertising manager E. Palmateer spoke about upcoming programs and the results of a survey of early campaigns.



# Along hydro lines

## Power pact

Ontario Hydro plans to enter into a \$95.5 million power-purchase agreement with Hydro-Quebec.

The pact calls for Ontario Hydro to purchase 500,000 kilowatts of continuous power between June, 1975, and May, 1977, at a cost of about \$35.5 million, and an additional 20 billion kilowatt-hours of interruptible energy over a six-year period beginning in 1971.

Ontario Hydro Chairman George Gathercole said economic studies indicate the power purchases would be comparable to the cost of generating the same amount within the provincial boundaries, but "it has the advantage of enabling us to defer capital expenditures which, on the basis of our load projections, would be required for alternative capacity in 1976-77."

The ties will be strengthened to increase the capacity to transfer power between the two provinces.

Even more important," says Mr. Gathercole, "this agreement will lead to the negotiation between the two utilities of an interconnection agreement to provide for mutual assistance in times of emergency." □

## Year of reckoning

Major new uranium discoveries will have to be reported before the end of 1969 if the risk of shortages or future higher prices is to be averted. Allan F. Lowell, chairman of the uranium committee of the Canadian Nuclear Association and Rio Algom Mines Limited marketing manager, pointed this out at a nuclear symposium in Milan, Italy.

Mr. Lowell said he feels big new discoveries are certain to be made in view of the extensive exploration drive in Canada and other countries. However, "the main problem is not the likelihood of results, but the precise time when significant discoveries will be made."

He explained that maximum annual capacity from now-known low-cost reserves in non-Communist countries is about 35,000 tons of uranium. By 1980, annual demand will be 80,000 tons, and rising in following years. Since it takes six to ten years to bring a mineral deposit into production, it is clear that "1969 will be a critical year for decision-taking both in terms of uranium procurement by consumers and in terms of mine-production planning by producers."

If no new discoveries are made, producers could develop low-grade ore bodies that would require higher prices than the \$10 a pound now considered reasonable. And if consumers resisted the higher prices with the result that the higher-cost production were not developed, they would face a risk of physical shortage of uranium by 1974 with inevitable higher prices. □

## Computerized sniffing

Down New York City way, air pollution is being fought with the computer. Mayor John Lindsay recently cut the ribbon on the city's computerized air pollution monitoring system.

Describing it as the "nation's first", the mayor said the system will provide regular daily readings of New York's most critical pollutants—sulphur dioxide, carbon monoxide and particulate matter. Costing \$500,000, the system includes 38 monitoring stations throughout the city, 10 of which automatically report to the computer each hour.

Every day at 4 p.m., the Department of Air Resources takes a reading and issues a citywide average of the pollutants. It also issues figures showing which boroughs had the highest daily concentration of each pollutant. □

## Bouncing bulb

Dropping a light bulb isn't the shattering experience it used to be — if it happens to be a variety just introduced by Westinghouse. Developed in Trois Rivières, the bulb is coated with a rubber-like sheath that makes it virtually shatterproof. Even if smashed or crushed, it won't fragment.

The lamp is ideal for outdoors since the coating resists breakage by thermal shock, rain or snow. It's also recommended for workshops where ordinary bulbs might be damaged by splashes of solder or welding flux, in manufacturing operations where glass contamination would be serious, and in playgrounds.

To go with the tough outer cover, the new bulb can be fitted with a rough-service filament to give it a complete shock-resistant rating. □

## Property job



Milan Nastich



J. K. A. Moore

Milan Nastich has been appointed deputy director of Ontario Hydro's Property Division, a post that has been vacant since Arnold Huddleston was appointed director in January, 1968. Mr. Nastich was director of the Computing Services Division.

J. K. A. Moore has been appointed head of the Computing Services Division. He was manager of Computer Support Services.

Mr. Nastich joined Hydro in 1949 after obtaining Bachelor of Arts and Bachelor of Applied Science degrees at the University of British Columbia. He has served as a planning engineer, methods analyst, manager and comptroller.

Mr. Moore joined Hydro in 1952 in the former West Central Region and in 1957 was one of the first recruits in the newly-established field of electronic data processing. He has held a variety of positions in the design and programming of computer applications, as well as in the modification of operating systems to meet special needs. □



## Caps off to Cap



*Another aim in life*

A wide circle of friends, neighbors, engineering associates, businessmen, Kingston PUC employees and representatives from other branches of the Hydro family gathered in Kingston recently to honor G. R. "Cap" Davis, who has retired after 15 years as general manager and chief engineer of Kingston PUC.

Born in Smiths Falls, Mr. Davis gained his nickname as a result of service early in his life on the steamboat Victoria, which operated on the Rideau Lakes for 40 years with his father, the late Captain G. A. Davis, at the helm.

After graduation from Queen's University with an electrical engineering degree in 1927, he joined Ontario Hydro. Mr. Davis subsequently became supervising engineer at Belleville in 1934. Three years later he joined Ottawa Hydro as superintendent of substations and engineer then in 1951 moved to the post of general manager. Late in 1953 he resigned to take over the reins of the Kingston utility.

Mr. Davis played a prominent role in utility associations, and is a past president of both the AMEU and EUSA. He is also a past chairman of the Canadian section of the American Water Works Association.

Among those attending the testimonial dinner which formed the tribute were Ontario Hydro 1st Vice-Chairman D. P. Cliff and Dr. J. M. Hambley, general manager. Former Ontario Hydro Chairman W. Ross Strike was also present.

With his wife at his side, Mr. Davis is shown assembling a gun, one of the gifts he received at the dinner. Helping out is J. K. Fee, who succeeded Mr. Davis as PUC general manager. □

## Instant cooking

The first microwave oven designed specially for domestic use is being introduced in Canada.

Like its commercial counterparts already on the market, the oven reduces hours of cooking to minutes and minutes to seconds. Bacon is ready in 90 seconds, a baked potato in four minutes and a five-pound roast in half an hour. Measuring 15 by 22 by 17 inches, the instant oven can hold a 24-pound turkey. It plugs into a standard kitchen outlet.

Cooking is accomplished by bombarding the food with microwaves, agitating the food molecules. The suggested retail price is \$669. □

## Giant grow-in?

The Bradford Marsh market garden area north of Toronto could become the largest greenhouse in the world. At least that's the opinion of Robert C. Peterson, a University of Toronto graduate.

Mr. Peterson says the whole area could be covered by a transparent polyvinyl dome. At present, individual farmers erect plastic

greenhouses and grow high-priced crops during the winter. However, with the area-wide dome, work could be carried on by automated methods now used during the conventional growing season. The additional income from these winter crops would amortize the cost of the huge bubble. Snow and rain falling on the dome could be collected in ditches at the base and used for regulated irrigation. The farmer would have a controlled climate to work in and could more effectively control pollutants and insects.

## ... and one for the backyard

Terence McLorg, a prominent Ontario engineer who envisions whole communities enclosed under huge air-supported plastic domes (Hydro News, Feb., 1968), has been given permission by Etobicoke to test his theory in his own backyard.

He will build a "polydome" 12 feet high covering 1,000 square feet to see how it stands up against wind and snow.

Although the structure doesn't meet specifications of the city's building codes, the building committee approved a temporary 18-month permit. Neighbors, who have no objection to the experiment, helped Mr. McLorg gain approval.

## Awards for ads

Ontario Hydro's entry of four industrial-commercial electric heating advertisements has received one of the three Peabody Awards in the category of publication advertising.

The awards, instituted in 1962, are presented for excellence in building product literature by the Canadian Joint Committee on Construction Materials sponsored by the Royal Architectural Institute of Canada, the Canadian Construction Association, the Association of Consulting Engineers of Canada, the Division of Building Research and the National Research Council.

Primary criteria for awards are the impact on the architecture profession, good taste and educational value. The Hydro advertisements were developed from case histories through Foster Advertising Ltd. and featured installations of electric heating in a university, apartment building, public school and church.

## Floating chalet



*Snow boat*

Meaford harbor is the site of one of the world's most unusual chalets. In fact, it is a \$200,000 electrically-heated pleasure craft.

The owners, Mr. and Mrs. Hugh Hall of Toronto, have been using the boat as a base camp during weekend skiing trips. Completely electronically equipped, the craft, which sleeps six, was brought to Canada from Europe by freighter last year.

A bubbling system keeps the craft from being crushed in ice. A forced air compressor on the dock is connected to the



anchored on the harbor bottom. Air from holes in the hose bubbles up around the hull, bringing warmer water from the bottom with it and thus preventing ice from forming. Apart from keeping passengers warm, electric baseboard heating keeps the craft free of snow since the steel hull isn't insulated. The Halls will be cruising Georgian Bay in the summer with Meaford as home port. □

## Extra education



husman's holiday ?

Nuclear power means a lot more to 100 Scarborough PUC employees and their families now.

The group gave up one of their Saturdays to tour Ontario Hydro's Pickering nuclear power station. But the tour was only the culmination of a six-week familiarization course of 15 lectures given by the project public relations officer Don White (centre with microphone). The course was arranged by Scarborough PUC's customer relations and sales representative, John Daniel.

Pickering's information centre opened in January, 1967. In that year, 49,000 people were shown around the site. Last year more than 100,000 saw the plant, which is due to start up in 1971. □

## municipal briefs

Toronto Hydro is spending \$30,000 to enable a computer to keep it cool. The money is for air conditioning and humidifying equipment to keep the machine working happily in a 75-degree temperature and 50 per cent humidity. "You know the kind of fuss we can get into if someone gets a wrong bill," explained Harry De, general manager. "If the machine isn't pampered it might add a few zeros on the end of a bill in retaliation."

Surprise awaited customers as they opened their Etobicoke Hydro bills. Not only did they have money to pay out, they were being asked to give their time to social work. The plea came from the Etobicoke Volunteer Bureau, set up on an experimental basis two years ago to find workers for social agencies. Volunteers are asked to visit senior citizens, read to the blind and act as foster parent and uncle to disturbed children at Thistletown Hospital.

Electric comfort is the watchword for a new subdivision at Markham, north of Toronto. The 41-home development is among the first in Canada with electric heating and air-conditioning installed in speculation homes.

Staying on a family tradition in both vocation and public service is a trademark of the Murphys of Smiths Falls. When Smiths Falls Hydro was formed in 1918 its first chairman was the late J. W. S. Murphy. Now his son, Dr. W. O. Murphy, has been elected chairman for his 10th consecutive term.

Thanks from the town of Forest were recently tendered to Stanley

Ellerker in the form of a dinner. The occasion marked the completion of half-a-century of service to Forest PUC. Mr. Ellerker joined the commission as an employee in 1918 and retired in 1962. He then served as a commissioner until last year. Outside the utility, he has been active in the local Cancer Society and is currently serving as president. More than 100 people attended the dinner at which Mr. Ellerker was given a wallet containing two \$50 bills.

Oakville PUC has adopted in principle a 10-year plan for installing underground wiring in the central section of the town. Costing more than \$3 million over the decade, the plan took R. T. Gayowsky, underground distribution engineer, three months to prepare. The first phase calls for \$90,000 to be spent this year on a six-block area in the older business section.

Practical guidelines for both labor and management must be established, John T. Barnes told a recent Sarnia Hydro meeting. He said that management can no longer budget intelligently against the current unpredictable rising costs. The veteran commissioner warned that rising costs were "sending this economy closer to the day of reckoning or saturation where we will find ourselves out of work with no foreign or domestic markets."

George H. Glover, a former member of St. Marys PUC, died recently. Mr. Glover, 70, joined the 34th battalion, Canadian Expeditionary Force, in World War I and was later wounded. He was a cadet corps instructor in World War II and was a member of the local Industrial Committee for a number of years.

Combined hydro and water bills will result from a move by Windsor Utilities Commission to have its accounts processed at the local IBM data centre. The electronic processing should be in operation by June.

One hundred and one years of service were honored by Campbellford PUC with the presentation of three chaise longues. One went to Florence Thomas, who retired after 45 years on the office staff. Another went to James O. Benor for his 28 years as a commissioner and the third went to Wilson Rylott, who worked 20 years in the electric department and another eight with the waterworks section.

Little grass grew under the feet of Preston PUC sales and service representatives in 1968. A report to commissioners shows a total of 6,412 miles logged by the staff. Fifty per cent of their time was spent on sales, 25 per cent on service, 10 per cent on promotion and the balance in the office. Electric heating sales in the commercial field stood out from other areas, with a target of 75 kilowatts surpassed by 13 per cent.

Sault Ste. Marie PUC said goodbye to its longest serving employee recently when the commission presented a certificate to George M. Walker. The presentation marked the completion of 50 years and six months with the utility.

At a monthly cost of 7.7 cents per customer, Sarnia Hydro has decided to step into the computer age. The commission is to replace 12-year-old billing machinery with an IBM 360/20 computer. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

An election in Meaford recently produced a mayor and four PUC commissioners. And all are still in Grade Six. The young members were promptly invited as special guests to the inaugural meeting of the regular (and official) PUC.

No mere child's play, the exercise in communications started when Grade Six students at Meaford Elementary School decided





*On the young side*

to elect a mayor and PUC from among their classmates. Three boys and two girls emerged as victors, and were invited to participate in the first meeting of the 1969 Meaford commission. The students were given a tour of the offices and shops of the PUC, and suitable refreshment was served.

To help them remember the occasion, each junior commissioner received a certificate (above). The senior commission will remember the evening as a heartening example of student power in action.

\* \* \*

One of the strengths of the hydro utility enterprise in Ontario is that the knowledge and experience of each can be shared by all. To capitalize on this, the public relations co-ordinating committee has recently distributed a handbook to each municipal utility office in the province. Called "Public Relations for Hydro Utilities", the handbook is intended as a guide for commissioners, managers, and staff in the performance of their various responsibilities. New sections will be prepared and distributed at regular intervals to ensure that the information is topical in subject and practical in execution.

\* \* \*

How many other utilities have a regular column in their local newspaper? Since we mentioned the subject in January and February, two more have come to light. Nepean Hydro has been publishing a weekly column for almost four years, and reports "it is an excellent vehicle in which to answer questions put forward by our customers on the operation of their utility". A more recent addition is Stratford PUC, which secured the services of the retired city editor of the local daily to write a weekly column. A tip of the "Tell the People" hat to all these active utilities.

\* \* \*

One good compliment deserves another, and in this case it's a new program to recognize public relations achievements by individual utilities. Awards will be presented annually by the OMEA and the AMEU to a winner in each of three categories — for large, medium and small utilities. This means that competition will be only among utilities of similar size. Judging is based on performance during a calendar year, and winners will be announced at the following year's March convention. □

## Steel giant

The Steel Company of Canada has predicted that its future steel-making complex at Nanticoke, on Lake Erie, will have an eventual capacity of 10 to 12 million ingot tons a year. And that's more than double the 4.5 million tons that the company's Hamilton installation can turn out.

Next door to Ontario Hydro's 2,000,000-kilowatt thermal project, Stelco's complex is scheduled to get underway in 1970. In three years, \$200 million will be spent on phase one — a flat

roll plant. Phase two would be the furnaces and the final phase would include a cold rolling, finishing and treating installation. Early estimates say it will be 25 to 50 years before all is complete.

Alex D. Fisher, a Stelco vice-president, has announced that the company is considering the installation of electric arc furnaces that would convert iron ore directly into steel. Calling the process a major breakthrough, Mr. Fisher said 10 years of work in North America, Europe and Australia have gone into the process. Both the coke oven and blast furnace steps are by-passed.

The first of Nanticoke's coal-fired generating units is due for service in 1971.

## A man-eater



*On the large side*

One of only four in Canada, a scanning electron microscope (SEM) at the Chalk River Nuclear Laboratories of Atomic Energy of Canada Ltd. is getting some heavy use.

Already scientists have examined uranium oxide particles deposited in porous graphite, with the practical possibility of developing new types of reactor fuel; fracture surfaces of zirconium; uranium oxide fuel pellets and high nickel alloys. However, the most startling subject to date has been the study of insects.

Unlike the conventional electron microscope, which passes a beam of electrons through a thin specimen, SEM washes a beam of electrons over the surface of a subject and liberates secondary electrons. These are collected and displayed on a cathode ray tube. It's much like the scanning of a television system, but at a slower rate. Photos appear almost three-dimensional and are more desirable than thin cross-sections.

Why should AECL be studying insects? Scientists there have been involved for several years with the radioactive tracking of blackfly and other pests to determine their migratory habits. These investigations may eventually lead to better methods of control.

## January energy production

Primary energy provided by Ontario Hydro in January totalled 5.53 billion kilowatt-hours, an increase of 7.6 per cent over the same month a year ago.

Adjusted for seasonal influences, primary energy demand in January was 4.99 billion kilowatt-hours, .02 per cent more than the previous month.

The seasonally adjusted total for January represents 59.83 billion kilowatt-hours at annual rates. This is 430.10 per cent of the energy demand in 1949. □





## as don wright sees it

Admirable as the federal government's intention may be in attempting to spread the doctrine of bilingualism from the rock-bound shores of Newfoundland to the rose gardens of Victoria, we tend to share the trepidations of Premiers Roberts and Bertrand regarding the establishment of sharply defined official bilingual districts. This is proposed in the Official Languages Bill, which would create bilingual districts in those areas where at least 10 per cent of the population speaks French (or English in the case of Quebec). Laws without teeth are prone to die from indigestion and it would be interesting to know how they intend to enforce this linguistic segregation.

Some sort of physical boundaries would seem necessary, even if only painted lines, and these would require constant patrolling to maintain the status quo. Even the birth rate would have to be watched in those areas close to the 10 per cent minimum.

It would also seem logical to insist that the minority in each district actually speaks the prescribed language for at least 10 per cent of the time. Official eavesdroppers might work, but the nan on the street is likely to resent the heavy hand of the law on his shoulder for the want of a oui, oui or a couple of bonjours.

Happily, there is a better solution. Why not scrap both languages and establish a brand new tongue based on sights and sounds peculiar to the land. This could incorporate words and idioms borrowed from the languages of the two founding races—Indian and Eskimo—together with alphabetical characters designed after the likenesses of native creatures such as the Canada Goose and the Arctic Weasel.

Starting from scratch like this, the language might be expected to lack those distinctive geographical accents we hold so dear. But this could be overcome by establishing official background noises to be employed by the people of the various regions during halts in the conversation and while listening to the other fellow.

Maritimers, for example, could intersperse their remarks with wet, smacking sounds reminiscent of a cod fish flopping about on the bottom of a boat. Quebeckers could produce sharp, popping noises as of bombs exploding in distant nail boxes.

Western folk might adopt a kind of a whining noise to be interpreted either as the sound of

the wind in the wheatfields or a continuing complaint against the money barons of the east.

We, here in Ontario, already have a distinctive background sound that sets us apart. The gasping and hacking that accompanies our conversation also proclaims us citizens of the province with the greatest concentration of air pollution.

The point is, we've got to think big and act fast before the whole family breaks up. What's needed is a patriotic rallying point which is above parochialism and beyond regionalism. A language such as the one we suggest might do the trick.

Imagine the tremendous national pride our background noises would arouse at gatherings such as the Olympics or world hockey tournaments. Issuing from a thousand throats, the combined gasping, whining, flopping and booming would certainly bring tears to the Canadian eye and a catch to the international throat. Then maybe we could forget about goals.

■ Sound a trifle loony? It's our contribution to the think big theology which is very much of an in thing these days. As we understand it, thinking big is an end in itself and if the results happen to prove practical or helpful then the thinking just hasn't been big enough. Such concepts as the proposal to pump out the Arctic to warm our weather, the establishment of under-sea cities to extend the useful land area, and the building of a canal to link Mustache Mountain, Saskatchewan, with Mexico City are the kind of thing we have in mind.

Big thinking is really quite harmless so long as the practitioners stick to the rules. The danger is that someone will try to implement one of these schemes and break the lot of us. Anyone found taking action, or even contemplating action with regard to any of these super-thoughts, should be prosecuted to the full extent of the law.

■ If Canada has its language problems, Ireland has its color problems and it's encouraging to find that the Orange and the Green are to be joined better electrically. By the end of the year, the North will be linked with the South by an extra-high-voltage transmission line which is expected to save each country millions of dollars in the construction of generating facilities.

As a matter of interest, the Republic of Ireland has a total installed capacity of 1,290,000 kilowatts with a rock-bottom, summer night demand of only 200,000 kilowatts. Hydro's giant Lakeview plant could supply enough power to meet the peak demands of both North and South.

The new inter-tie is said to be a "vital prelude to nuclear power in the Emerald Isle" and it's nice to hear them talking atoms in a land where peat from the local bogs still accounts for a sizeable amount of the power generated.

In any event, it's to be hoped the new inter-tie can be viewed as non-sectarian. There will be those opposed to the whole thing on the grounds that electrical integration is immoral. Sure and all, kilowatts produced in the Godless North aren't likely to be of the same quality and purity as those raised in the more enlightened lands to the South.

■ One subject which continues to capture public fancy is the relationship of light and dark to the amours of man and beast. Recent reports tend not only to confirm such a relationship but they suggest that man and beast are at opposite ends

of the spectrum. Beasts are more enlightened.

In Syracuse, an attempt to stop vandalism by installing lights at the local zoo turned the place into a maternity ward. Fooled into thinking it was spring by the long hours of light, such inmates as cougars, bears, kangaroos and chimpanzees turned in prodigious performances and brought forth all manner of off-schedule litters.

Man, on the other hand, is a creature of the dark. In England, one town councillor proposed that an on-off switch be installed on a light standard newly erected in a lovers' lane. Frustrated swains had smashed the bulb 12 times in a matter of weeks.

■ But it may not matter very much one way or another. Love itself may be on the way out—except perhaps as an idle pastime. After experiments with the test-tube fertilization of human eggs, scientists are beginning to support the theory that virgin birth is quite possible. They know, for example, that by exposing the ova of rabbits to the cold, the animals can follow through with the progeny without any help whatsoever from the buck.

In effect, the male may be on the verge of losing one of the few remaining roles he has been able to regard as essentially his. Mademoiselle, on the other hand, will be free to ascribe any untoward changes in her appearance to an over-dose of cold.

■ Frogs and their sex problems seldom hit the headlines but their amphibious antics have been in the news twice of late. The first item, headed "Nuclear Engineers Foiled by Frog's Sex Problems", had to do with stringing a cable through a conduit and under a road at the Douglas Point power project with the aid of a mouse. They started with a string tied to the mouse's tail and progressed to the cable.

But they turned to the mouse only after a frog had refused to co-operate—even after a second frog, thought to be a female, had been placed at the other end of the pipe as bait.

The second instance of frogs refusing to go a-wooing in the interest of humanity occurred during an attempt to film their mating habits for the edification of public school students. A film company shot more than 10,000 feet of two frogs mating—but it wasn't easy.

Film crews stood by for two weeks trying to catch them in the act and it wasn't until a biology professor injected them with some kind of serum that the reluctant lovers co-operated.

The frogs are part of a series of sex education films to be shown in Canadian schools. And while the next generation may be no great shucks at history or geography, they'll sure as heck know all about how frogs get their kicks.

■ That Douglas Point mouse, by the way, may be the forerunner of a long and mutually profitable association between the wee timorous beasties and the nuclear industry.

British scientists have discovered that mice can tell the difference between ordinary water and heavy water—a rather remarkable facility considering that the two compounds are identical, chemically. How it's done is the mouse's secret, but he could be a mighty handy fellow to have around a nuclear plant. Heavy water is expensive and a good mouse could easily pay for his room and board by sniffing out leaks in the moderating system. □



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### the cover

An explosives expert prepares for blasting at the Nanticoke power project, on Lake Erie. Because of the proximity of homes and the fact that concrete is being poured nearby, it's a delicate task calling for careful planning and special procedures. More about the job appears on page eight.

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## Viewpoint

# regional government

Regional government has been much to the fore in provincial thinking in the last few years and more recently it has tended to overshadow all other subjects on the municipal scene. The plethora of studies, reports, speeches and press conjectures on the subject has dealt at length with virtually every civic aspect likely to be affected by regional government.

The distribution of electricity has been a notable exception. Why? As explained by Municipal Affairs Minister Darcy McKeough, the government simply hasn't got around to this aspect of regional planning. But with the Ottawa-Carleton area already administered by regional government and other areas on the verge, the Hydro aspect won't be neglected much longer.

Assuming that the government recognizes the special nature of the Hydro enterprise, and there is every indication that this is the case, it will not endeavor to place local Hydro under committees of council.

But the government does seem intent upon returning many of the councils' responsibilities which have been farmed out to other special purpose bodies over the years. Conceivably, then, it might like to see other areas such as water, parks and transportation transferred to councils under a regional set-up, leaving local Hydro commissions to distribute electricity.

Even so, this still leaves a number of alternatives. Under a two-tier system of regional government should Hydro operate at the top or secondary level? Or should the present system be maintained with the several independent utilities continuing to serve their existing territories within a region? And should the local commissioners be elected or appointed?

Considering that one of the main purposes of regional government is to consolidate in the interests of economy and efficiency, it seems unlikely that Hydro as it is now will be acceptable — but these are the kind of questions the Department of Municipal Affairs will be asking itself as it seeks to establish the optimum form of electrical distribution under a regional administration.

The most obvious source of information and guidance is Hydro itself. Doubtless the government intends to use this source.

At the municipal level, the Ontario Municipal Electric Association has already been invited to study the matter and to submit a workable framework for Hydro within a regional government. As a guideline it has been informed that a single, uniform system applicable to all regions may not be the complete answer.

With this advice in mind, the association passed a resolution at its recent annual meeting establishing general procedures. It will work with its affected local Hydro commissions in areas where regional government is to be implemented and strive to reach accord with them and with Ontario Hydro in order to recommend suitable plans to the Department of Municipal Affairs.

With over 580,000 direct retail customers of its own, Ontario Hydro is, of course, vitally concerned with the regional concept. It enjoys close and continuing liaison with the various government departments and its views will be carefully weighed.

Whatever the outcome, one thing is sure. Regional government will be introduced in Ontario on a progressive basis and changes affecting the Hydro organization are on the way. They will be worked out to the best advantage of all, and more particularly the power users of the province, with a co-operative, open-minded approach involving the municipal utilities, the provincial Commission and the departments of government concerned. □



# Spring Sweet Spring

*Story and photos  
by Nick Nickels*



The picturesque Madawaska Valley will never be quite the same. For one thing, new power projects along the river have helped open up this once isolated area of Eastern Ontario. While their primary purpose is the generation of energy, hydro-electric stations are providing improved roads and



tranquil lakes that should prove a boon to the local tourist industry. Traditional attitudes are also changing in this predominantly agricultural region, as the establishment of this highly successful maple syrup co-operative shows.



There's a triumphant ring this spring to the schoolboy's traditional shout "sap's running," midway along the Madawaska Valley in Southeastern Ontario.

The exultation springs from the upturn in maple syrup-making in a region that had all but succumbed to a general despondency that has just about wiped homemade syrup from the Ontario marketplace.

Owners of maple bush lots throughout the province are blaming the decline of present-day syrup-making on high labor costs, a lowering sap yield and the housewife's preference for buying artificially-flavored maple products over the real thing.

While producers generally look upon syrup-making as found revenue, Madawaskans today count on it as a highly important segment of financial survival.

A government survey in 1960 showed 39 per cent of the farms in the central Madawaska Valley earned less than \$1,200 from total cash crops, including maple syrup.

The small antiquated syrup industry made little sense to a 75-year-old backwoods farmer William Murray, of Purdy settlement. The leached-out farms in the area contained some of the finest maple stands in Canada, but no one envisioned their potential for a major syrup-making enterprise. Except Bill Murray.

He foresaw a self-sustaining industry on the family bush lots and adjoining Crown lands that could produce annually 200,000 gallons of maple syrup, valued

at almost a million dollars. His "wild" ideas received nothing but ridicule.

But before the laughing died down completely, the dream talk caught the sympathetic attention of Father Eugene Cullinane of Palmer Rapids.

The understanding Catholic priest and old Protestant hill farmer got together and presented a comprehensive brief to the Ontario headquarters of the Agricultural Rehabilitation and Development Association. They received a sympathetic hearing.

ARDA arranged a trip for six Madawaskans to Quebec's 6,000-member maple syrup co-operative at Plessisville. They were suitably impressed and became convinced that a similar plan could be worked out at home.

After severe birth pains in 1966, the Madawaska Valley Maple Products



mer William Murray foresaw the potential  
a maple syrup co-operative. He is shown  
ending his wood-fired evaporator furnace,  
usting plastic piping and drawing off some of  
hot syrup.

y-operative has shown slow but steady  
rowth. To date, ARDA has granted it  
0,000. Each of the 31 current co-op  
embers received a portion of the grant  
ual to 33 per cent of the value of  
farm buildings, plus a \$2,000 operating  
an repayable over six years.

le loans buy material for building new  
aporator houses, modern evaporating  
quipment, holding tanks, pipeline pumps  
d miles of plastic tubing to carry sap  
m the trees. Gone are the spiles,  
uckets and horse-drawn tank sleighs  
d the production of indifferent syrup  
odes that never met federal marketing  
ndards.

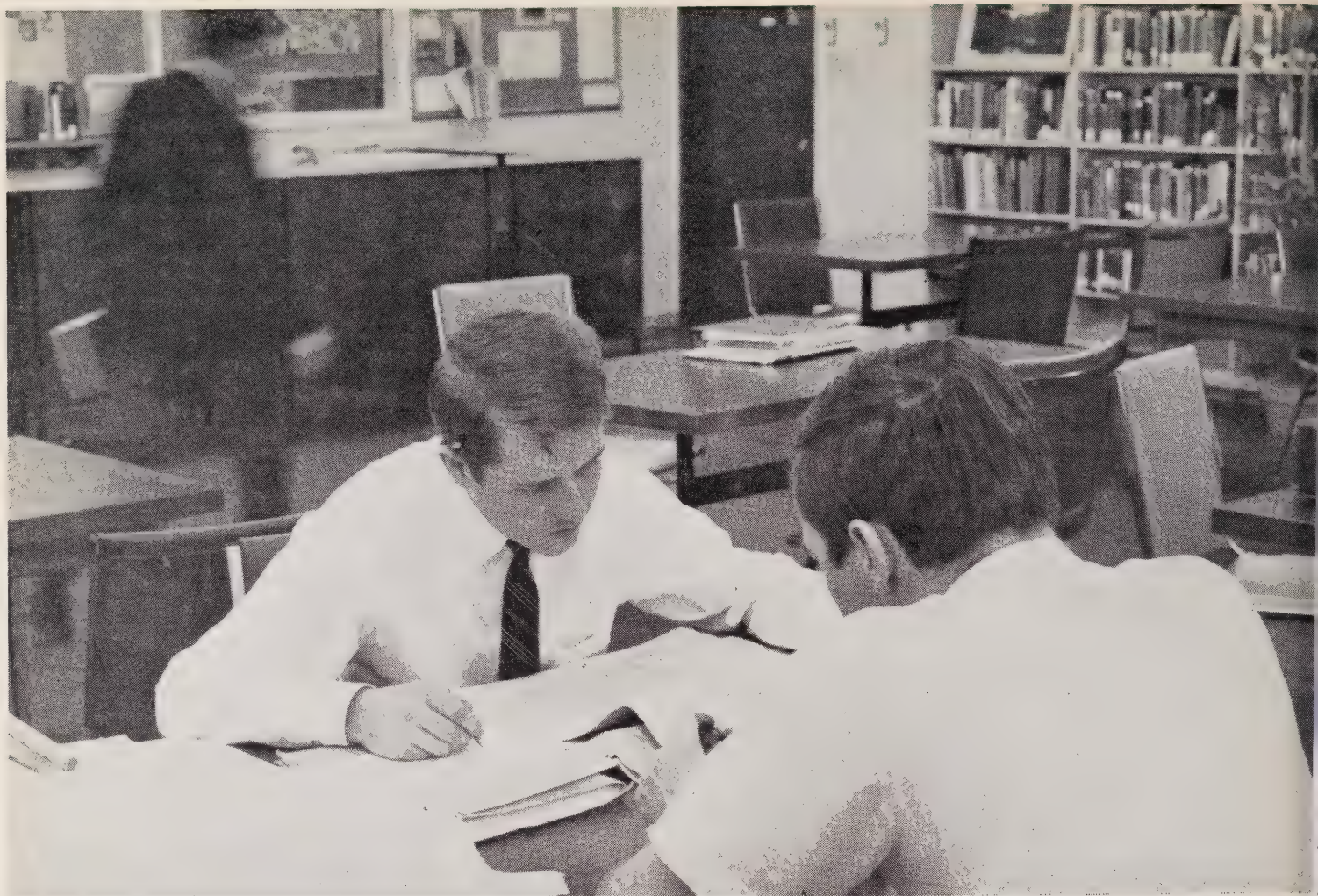
embers sell their syrup back to the  
op whose secretary-manager Garnet  
ke refines it at a new plant at  
mbermere.

rup production augurs well this spring in  
e Madawaska Valley. Deep snow  
ce early November has sunk far into the  
rsty woodland soils. Frosty nights and  
rm days are pumping a steady stream of  
o from roots to twig tops of the  
gion's vast maple forest. Syrup makers  
e drawing from the flow thousands of  
llons of sap and rendering it down to  
at could be a record run of 5,000 gallons  
standard graded maple syrup.

urmets looking forward to buying  
e "real thing" this summer will find it at  
res, restaurants, tourist booths and gift  
ops around the valley. And many a  
itor's taste buds will be titillated at  
e co-op's maple festival held this  
onth at Combermere. □







# dipple-t ripple swells to a flood

by Tom Muskett

Students at Ryerson Polytechnical Institute in Toronto were surprised and perhaps pleased when a graduate in Greek and Roman history from nearby University of Toronto enrolled in Business Administration because he felt his impeccable education had failed to prepare him for the everyday business of earning a living.

"I don't believe that any arts course is

practical unless you want to go into teaching," the student observed. "After all, we're living in a technological society." His words probably illustrate better than any detailed official report the new awareness among this country's student population of the necessity of learning how to do something specific in life. His awareness of technology today and in the future largely explains the reason for the recent appearance of those educational upstarts known as "community colleges."

Ontario calls them Colleges of Applied Arts and Technology — CAATs for short. There is now a string of 20 such learning centres scattered throughout the province. Some are new, others operate on leased premises and in conjunction with parent universities. But all are well attended throughout the year, night and day, by part-time as well as full-time students who share a common desire to learn something specific in the fields of technology, business and applied arts.

Equally important, students and educators share in a new philosophy and approach to the purposes, methods and meaning of education. Practical though it may sound, community colleges are largely the

result of the provincial government's promise to provide, through education and training, the fullest possible development of each individual to the limit of ability. In the long run, the policy will provide an economic competitive advantage for Canadian industry.

Four years ago when the community college bill was in the legislature, Education Minister William Davis explained how the CAATs would "meet more adequately the changing demands of challenging times," referring primarily to the needs of industry for more technologists and the needs of students at all levels of the socio-economic rainbow.

They would be, said Mr. Davis, designed to provide a variety of occupation-oriented programs of varying length for adults as well as for youth.

A look at the number and range of courses offered by the new colleges serves to suggest that the new philosophy behind education has gained a strong set of legs.

Each college consists of three divisions: Business, Applied Arts and Technology. Business students follow two and three-year routes in courses such as



cretarial Science and Business  
ministration which break down into  
ch options as computing, accounting  
d marketing. Applied Arts candidates  
dy two and three-year courses  
communications or home economics.

e Technology division includes one-  
r technical courses and apprenticeship  
grams as well as two-year technician  
d three-year technology courses.  
graduate technologists earn the right to  
"Dipl. T" (pronounced "Dipple-T")  
er their names.

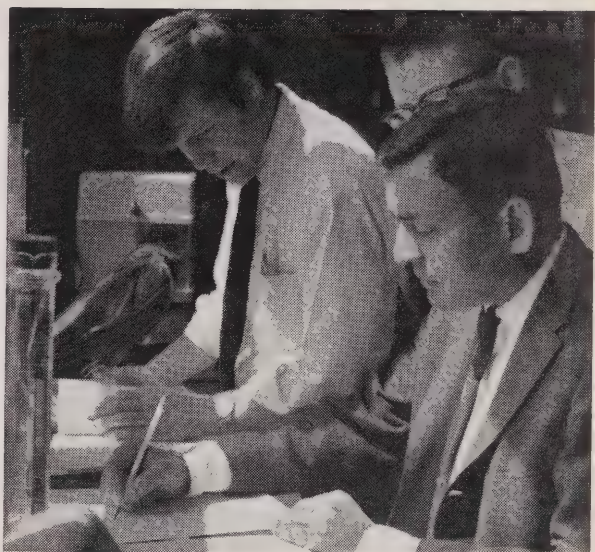
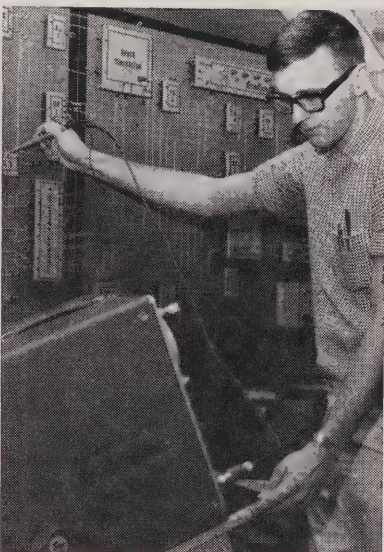
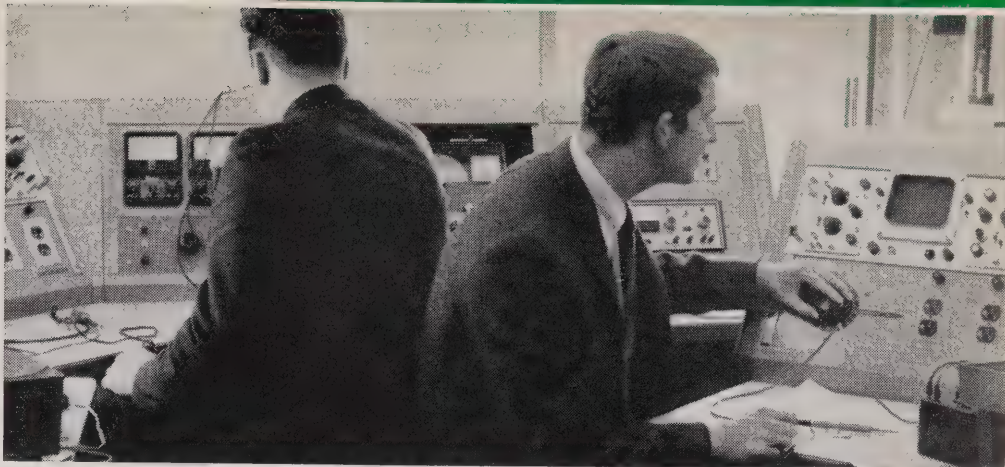
jects which technology students take,  
s the calendar of Seneca College of  
plied Arts and Technology in Toronto,  
designed to suit the technical field  
y will enter. Seneca states one of its  
ectives as the "attainment of a level of  
l and knowledge in a professional  
a sufficient for the graduating student  
be immediately useful in the field . . ."

e college also stresses the importance  
he ability to express findings "in  
ear and concise manner" and for this  
son specifies that students of technol-  
choose four English and Communi-  
ions subjects. If learning enough to  
ome immediately useful in the field as  
l as how to express ideas clearly  
it sufficient to occupy the student's  
d, then four options in Liberal Studies  
uld take up the slack.

e community colleges follow a  
osophy tailored to the needs of society  
well as the individual. The manifesto  
he community college scheme issued  
967 explained that the new schools  
st serve that large segment of society  
adequately served by university. To date,  
e has been much success in this goal.

vever, CAATs were also organized  
elp fill the need for technologists in  
ario and, as a result, were designed  
n elastic timetables to accommodate  
t-workers, regular students, part-time  
dents and even correspondence  
dents.

s emphasis on aptitude and experience  
er than past academic records has  
ned new doors to thousands of able  
ividuals who might not otherwise  
ee the opportunity to work toward a  
pple-T." More than that, community  
ege grads have reason to look  
ward to good jobs with respectable  
aries and roads for advancement.



A major role foreseen for the  
community colleges is that of continuing  
education. Dr. Alan Thomas, of the  
Canadian Association for Adult Education,  
feels the colleges are a major addition  
to our resources for adult education.  
"Many graduates can expect to keep  
returning to the community colleges for  
updating and retraining throughout  
their working lives," he says.

Reinforcing his view is the fact that  
many of the Canada Manpower training  
programs have been moved lock, stock and  
barrel into the colleges.

Dr. Thomas is at present working under  
a Kellogg Foundation grant to establish  
a national organization for the 84  
community colleges across Canada.  
A Canadian Commission for the Community  
College has been set up while such  
problems as finance and the transfer of  
students from one college to another  
or from college to university are under  
study. The ability of colleges to  
meet supply and demand on the labor  
market will be explored.

Newspapers frequently carry stories  
about the acute shortage of engineers and  
the ability of community colleges to  
alleviate this situation by training people  
who are technically competent. But  
many people feel it's not so much a question  
of producing more professional engineers  
as of making better use of the ones  
we've got.

"I've been hearing about this shortage  
of engineers for years," says Colin Wilson,  
secretary-manager of the Ontario Associa-  
tion of Certified Engineering Technicians  
and Technologists, "but I tend to think the  
real problem is under-utilization of the  
engineers we already have."

Mr. Wilson explains that too many  
engineers find themselves bogged down in  
many routine matters at a relatively low  
technical level. That's irritating to highly  
trained men who could spend their  
time more profitably using their ability to  
create and deal with abstract mathe-  
matical ideas.

"It's understandable then," says Mr.  
Wilson, "that engineers look forward to





*Ontario's community colleges put a lot of emphasis on practical skills. But that doesn't mean that students escape carrying armloads of books home each night.*

assistance from CAAT graduates who will free them from frustrating detail work and allow them to take their place at the head of engineering teams."

National statistics show that by 1970 enrollment in technical courses at technological institutions will equal or exceed enrollment in engineering courses at our universities. Next year, there will be about as many new graduate technologists as graduate engineers. Before the formation of CAATs, staff doing technical work above the trades level mostly came from two sources — professional engineers and technicians trained on the job.

Ontario Hydro has been hiring technologists for a variety of duties in several areas of operation for a number of years.

Ten years ago, for example, Protection and Control work was performed largely by professional engineers. Today, approximately two-thirds of P and C staff are technologists, spread across Ontario.

Protection and Control technologists do initial inspection of new equipment, trouble shooting and routine checking of existing equipment. They work with equipment such as measuring instrument protection relaying apparatus, communications equipment — telephone, FM radio and microwave — and power control instrumentation.

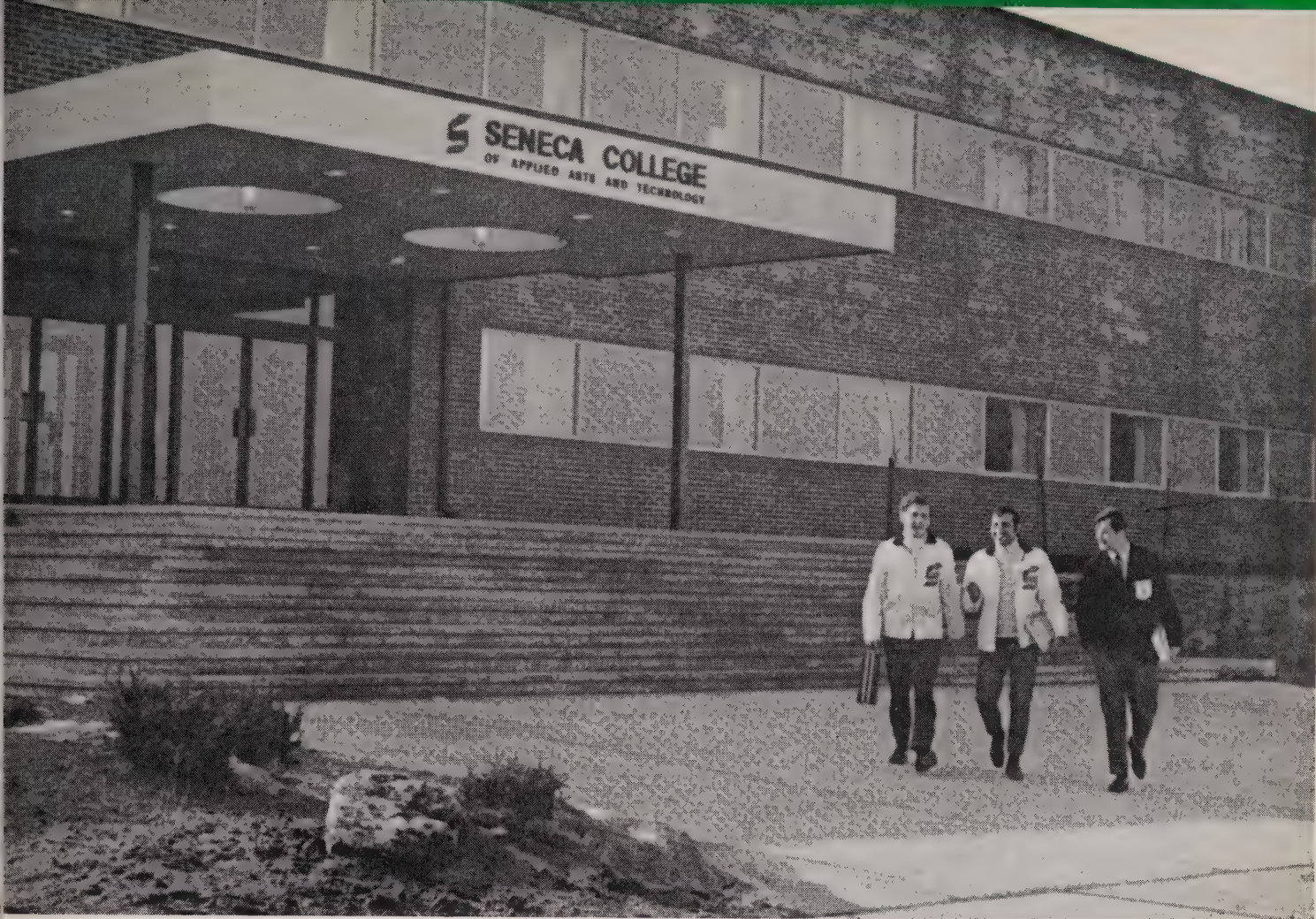
Like other years, more than 200 potential technological graduates were interviewed this year by Ontario Hydro at Ryerson and four community colleges that offer courses which attract Hydro recruiters.

John Buckingham, one of the Hydro men who visits community college campuses, says that between 30 and 40 of those interviewed will likely be hired.

The graduates will report to one of the 37 Protection and Control districts, entering a three-year period of both on and off-the-job training. As a group, the trainees spend two three-week sessions







year in formal study at the commission's new conference and development centre near Orangeville. Examinations follow each session, and many of the graduates will obtain certification as engineering technologists by the Association of Professional Engineers of Ontario.

As a philosophy to grow, people need to experiment and work together. Students and teachers at most community colleges tend to answer this description. One student at Centennial College says it, "We're all here because we want to be here." Sounds reasonable. You don't suddenly find yourself studying nautical technology or electronics.

Some teachers have abandoned posts atop dismasted pinnacles of industry in order to take part in the community college experiment. There's a better than average chance this sort of person never might learn a lesson in his life. His stock-in-trade is that mysterious commodity called experience.

Students like him because he's lived through what he talks about. They like him because he spices his lectures with anecdotes about the day he short-circuited an entire town by accident. They trust him because he's already passed the test in business, and has lived to tell about it.

When Johann von Goethe said a couple of hundred years ago that "in all things we learn only from those we love," this must have been the kind of teacher he had in mind.

If it's standards you're looking for, relax. Minimum requirements for a community college lecturer are a Grade 12 diploma plus six years' practical experience in the field he teaches. If he's a university graduate, he must have spent two years doing practical work, not necessarily in the field he will teach.

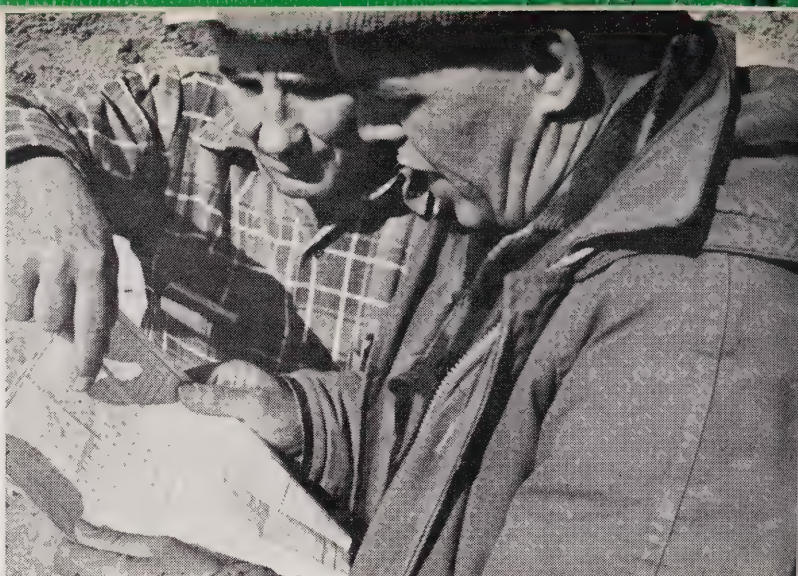
He should exhibit some record of initiative and the ability to inspire and lead — all handy attributes when you're in charge of a democratically principled class exploring current developments instead of merely following an autocratic curriculum. Some people like to describe him as a domestic Peace Corps worker.

The CAAT student must learn to live with criticism from some who believe the light treatment of liberal arts in technology courses may somehow transform him into an "industrial cripple" or a "spiritual gorilla." There are some who predict the new grads will always be treated as second-class industrial citizens — industrialized peons with a little know-how.

For the most part, such bleak landscapes painted by staunch right-guard university alumni have not scarred the psyche of many community college graduates.

"In the long run I think we're in a much better position than university students applying for a job with a general BA degree," says a Centennial College student. "We get a more specialized diploma and are qualified to do something right away." □





# handle with care

photos by Gary Smith

by Les Dobson

Each evening, shortly after construction workers on the day shift have left for home, a series of explosions rips through the otherwise peaceful site of Nanticoke power station, as yet a mere hole in the ground on Lake Erie's northern shore.

Windows in the temporary buildings erected there rattle with the concussion of carefully laid charges, exploding within milliseconds of each other. Thick rubber mats, put down to prevent rocks flying around like missiles, leap several feet in the air and settle amid the dust.

Blasting is in progress, as it has been five nights a week since last October and will be for a few months yet. But with the increasing need to build large coal-fuelled and nuclear-powered generating stations, Hydro's use of explosives has undergone a subtle change.

The days in which thousands of pounds of high explosives are packed into a





llside to change the face of the landscape  
 re numbered – in Ontario, at least.  
 ne by one all the economical sources  
 d hydro-electric power have been  
 eveloped. Only a few remain, mostly in  
 te far north.

tasting out the foundations for a large  
 thermal station like Nanticoke is a different  
 proposition, even though Ontario Hydro  
 laws will remove something like 160,000  
 bic yards of rock and contracting  
 mpanies must excavate at least as  
 uch again. Here, explosives are being  
 indled with kid gloves.

Ve can't carry on as though we were  
 a quarry," says Doug Kempton,  
 nstruction superintendent for the \$266  
 illion project. "Apart from the turbine  
 ock area and discharge channels, we're  
 mostly blasting out footings. And many of  
 em are only a few feet across."

other problem is that blasting and  
 ncrete pouring are taking place virtually  
 e by side. "In some cases, we're  
 ly 100 feet away," says Mr. Kempton,  
 nd the concrete, which takes 28 days to  
 ain full strength, is still green. We



*Charges are placed in holes drilled to a pre-determined pattern. Before firing button is pressed, the entire area is covered with thick rubber mats to cut down on flying rock.*





*Force of the blast lifts heavy mats several feet into the air.*

have to avoid cracking it by limiting the amount of explosive in each charge."

At present, seven drilling machines are each boring through the limestone rock at the rate of 550 feet a day in pre-determined patterns. Before the charges are placed, the 2½-inch diameter holes are steamed out to get rid of ice and snow and cleared of small stones or other obstructions. The explosive, which comes in cardboard cartridges, is loaded in the holes and, to prevent sparks, is tamped down with a wooden rod. The charges are fired by detonator caps and also by an explosive cord which runs down the hole from one charge to the next and ensures that each of the charges in a hole goes off as planned.

To avoid flying rock — apart from the possibility of doing damage around the site, there are summer cottages within half a mile and the village of Nanticoke is just over a mile away — the blast area is covered with two-ton rubber mats.

These consist of half and quarter sections of old tires wired together, and they're extremely effective.

One method of keeping concussion to a minimum is to introduce a slight delay between each charge. In this way, a series of minor shock waves is emitted rather than one devastating tremor. The time interval between each explosion is measured in milliseconds. There may be as many as 20 or 30 separate explosions in a single sequence, to many people indistinguishable from one blast. However, the experienced observer can tell the difference.

Once the explosives experts have done their stuff, the way is clear for excavation machinery to move in the following day. Little upsets the work schedule. Blasting takes place in all weather, apart from an electrical storm — static may cause a premature detonation.

A further technique by which the men at Nanticoke are cutting down on vibration is by deliberately introducing a discontinuity in the rock between the blast

and the fresh concrete by a process called pre-shearing. Normally, pre-shearing — the isolation of an area from the surrounding rock by drilling or blasting a shear crack around it — is employed to obtain a clean rock face. The method was developed in the United States and put to early use during construction of the Robert Moses power station at Niagara Falls in the late fifties.

"Rock strata are so frequently criss-crossed with cracks and faults that vibrations would be dampened anyway and pre-shearing would have no additional effect," says Aubrey Edwards, a research engineer with Ontario Hydro. "But the rock at Nanticoke is unusual in that the strata stretch unbroken for 1,000 feet or more in places.

"It's the first time I have seen this in the many cases I have studied," he adds.

Mr. Edwards has the tricky task of helping to prevent damage in the area by recommending blasting procedures and the maximum size of charges. Unfortunately, blasting is not a well-defined science and the unexpected is never far away.

"We still don't know enough about explosives," he says. "You're never quite sure how a blast is going to go, especially in a new area. You have to treat them with the greatest respect because they may go off differently than anticipated."

Today, there's a great deal of talk about the use of nuclear explosives for large blasting jobs. There are plans to carve out a new canal across the Panama isthmus, for example. And here in Canada, the engineers at Hydro-Quebec are considering the use of a nuclear device in a proposed hydro-electric development at James Bay.

Any such device would be used to create a diversion canal. It is believed that a well-placed nuclear explosion could slice the cost of this and similar large-scale excavation jobs by as much as two-thirds.

But in Ontario, the emphasis is on thermal-electric generation. Already it has been announced that two huge power stations will follow Nanticoke into service — a 3,000,000-kilowatt nuclear plant at Douglas Point on Lake Huron and a 2,000,000-kilowatt coal plant at Bath, near Kingston. And, if energy demands keep rising as predicted, this is just the start.

With a great deal of intricate excavation work lying ahead, it looks as though Hydro's explosives men will be wearing knee pads for some time to come. □



# big fish in a warm pond



Conservation-minded Britishers can shed some light on the current controversy about the effects on fish of warm water discharged by large thermal-electric plants. The UK's Central Electricity Generating Board operates a fish hatchery at the Trawsfynydd nuclear power station in North Wales. Rainbow trout are bred there for re-stocking an artificial lake from which the plant draws its cooling water. The lake, created 30 years ago by the North Wales Hydro-Electric Company, is situated in Snowdonia National Park near Trawsfynydd village. The nuclear station produced first power in 1965 from its graphite-moderated, gas-cooled reactors and has a capacity of 500,000 kilowatts. As shown here, fly fishing trials for anglers have been held in the shadow of the station. The CEGB annual report says recent advances in fish farming have established that heated effluents from power stations can profitably increase the rate of growth of fish. Studies have been conducted by the CEGB and the British Ministry of Agriculture into the possible harmful effects of cooling water discharge from the Bradwell nuclear power station

on the Blackwater estuary. The studies, carried out over a six-year period, concluded that the discharge has had no harmful effect on oyster beds in the estuary. In addition to Trawsfynydd, the CEGB has hatcheries at other thermal-electric stations in various parts of the country. In connection with its own thermal-electric stations, Ontario Hydro is at present engaged with the Department of Lands and Forests and the Ontario Water Resources Commission in a comprehensive program of marine studies near the site of the Nanticoke power project, on Lake Erie. □





# hello mr. chips

by Hal O'Neil

When you're 21, it's a very good year. It may sour somewhat when it becomes apparent that a mere stripling less than half that age is stealing the spotlight. But that's the way it is with the transistor and its fantastic offspring – the integrated circuit.

Nicknamed the "fabulous midget" when it was born in 1948, the transistor has had an immeasurable influence on humanity in a short 21 years. Its potential was early recognized with the awarding of a Nobel Prize to its inventors – Bell Telephone Laboratories scientists John Bardeen, Walter Brattain and William Shockley.

From this tiny device there grew a multi-billion dollar industry, employing hundreds of thousands of people around the globe. Transistors were put to work in everything from wristwatches to computers and satellites. In the latter two cases, it actually made them technically feasible.

Basically, the art of electronics depends upon the ability to control the flow of electrons in electrical circuits. The transistor

was the second generation of such devices. Half a century ago, this was first accomplished in radio transmission and reception by vacuum tubes. Even today, certain electronic functions can be performed no other way. Visual display of a television picture and generation of X-rays for the diagnosis and treatment of disease, for example.

After World War II came a solid-state revolution led by the transistor. Fashioned on tiny slivers of germanium or silicon, these tiny devices replaced larger, more expensive, power-hungry tubes.

Today, the third generation integrated circuit has created yet another electronic revolution. ICs have the same long-lasting performance as transistors, the same miserly use of electric power, the same compactness and rigidity of a solid structure, the same inexpensive manufacturing techniques. But where a single transistor once "grew" on the surface of a slice of

silicon, now an entire electronic circuit takes form in the same amount of space.

As direct descendants of the transistor, integrated circuits rely on the same basic fact – that the electrical properties of pure silicon can be tailor-made by the addition of small, exact quantities of impurities called dopants. Elements like phosphorus and arsenic, which have more "available" electrons, and boron and indium, with fewer electrons, are used. They're added by diffusing them into the crystal at red-hot temperatures.

These tiny chips of silicon are so small they'll pass through the eye of a needle. Yet built into each of them is the capacity of about 50 separate components – transistors, capacitors, diodes, resistors and their connecting wires.

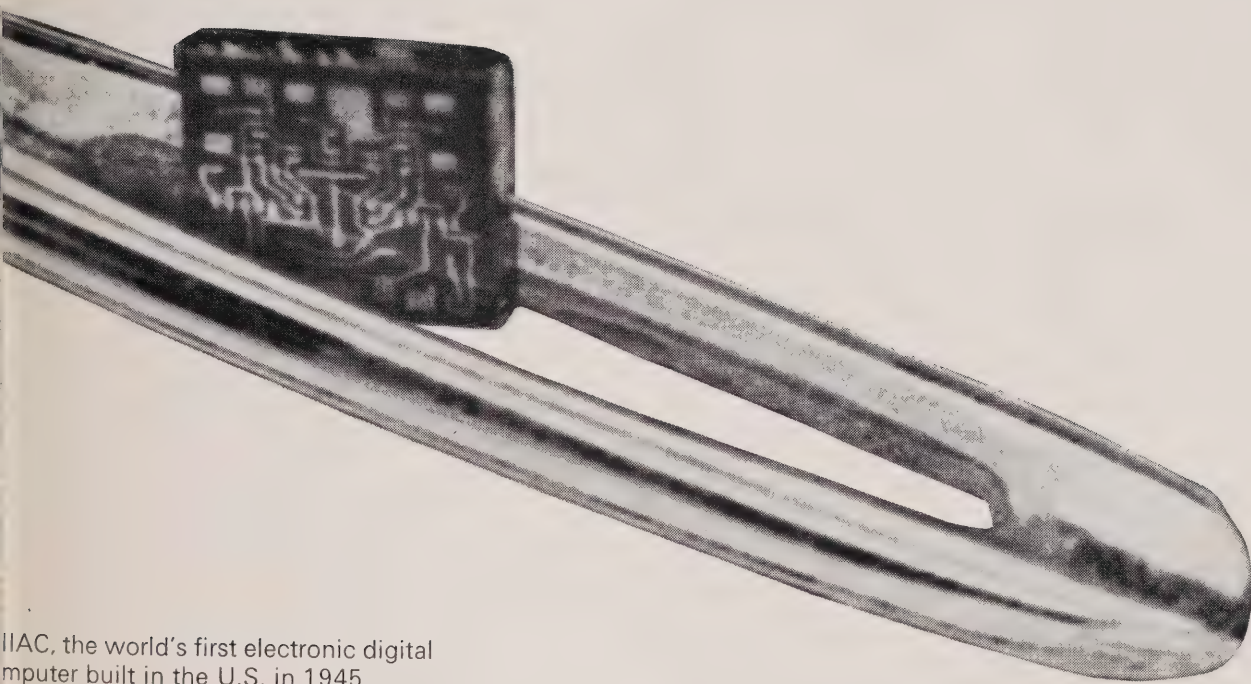
One way to visualize how the chip functions is to compare the flow of electricity through it to the flow of water through a distribution system.

The transistor operates like a valve, controlling the amount of water passing through; the diode determines the direction of flow; the resistor, as its name implies, restricts the flow of water; and the capacitor functions as a storage tank, in this case storing electrical energy instead of water.

ICs save remarkably in the size and weight of electronic systems. It's a far cry from



Some vacuum tubes to entire circuits that will pass through the eye of a needle



ENIAC, the world's first electronic digital computer built in the U.S. in 1945. ENIAC's 19,000 vacuum tubes far exceeded the number ever before built into a single electronic mechanism and foreshadowed cumbersome machines that were nevertheless required by both government and industry.

Though the arrival of the transistor helped the day, the electronics industry was still left with individual components that had to be interconnected. These connections not only were a weak link in the reliability chain, but also affected the speed of response. Early transistors could respond at a rate of a few million times a second; not enough for radio and hearing-aid circuits but far below the velocity needed for microwave systems or high-speed computers. Today's discrete components are extremely fast, but delays incurred while

signals travel from component to component and circuit to circuit limit over-all speed.

Thus, the point of the third generation's extraordinary micro-miniaturization is not so much to make circuits smaller per se, as to make circuits that are rugged, long-lasting, low in cost and capable of performing electronic functions at extremely high speeds (billionths of a second instead of millionths).

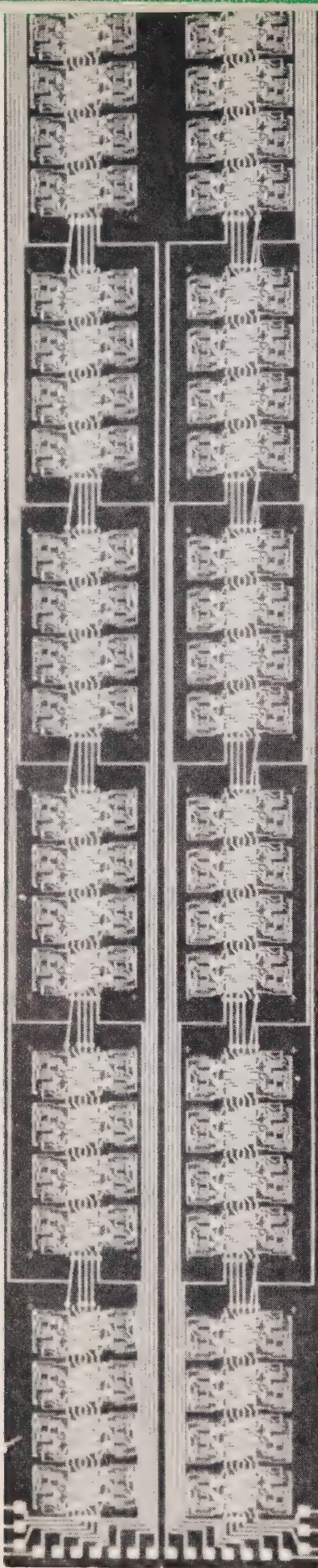
With the new micro-electronic technology it is hardly more costly to put 100 circuit

elements on a single chip of silicon than it is to put one. A good transistor in 1960 cost about \$1; today an IC with several dozen components can be bought for about the same price.

Improvement in the reliability of integrated circuits over conventional circuitry is 10 to one. The U.S. Air Force has cited life expectancies of 2,000 years for ICs it has in service.

The manufacture of integrated circuits requires massive doses of technological know-how and equipment, but precious little of what the devices are made. And yet silicon, after oxygen, is the most abundant





*Bar of silicon being sprayed in this super clean environment will eventually be the foundation of minute integrated circuits like those on the left.*

element on earth. Although silicon is found everywhere from the beaches of Nova Scotia to the crags of the Rockies, only the purest mineral is used in ICs. In fact, some 99.9999 per cent pure.

This super pure silicon begins as a solid bar about 1¼ inch in diameter and two feet long. It's then sliced into fingernail-thin wafers. Next, the wafers are polished to eliminate surface imperfections and then heated in a furnace where a layer of single-crystal silicon is deposited by exposing it to a silicon compound vapor. This layer is then doped with an n-type (phosphorus or arsenic) impure gas. To complete this stage, the wafer is exposed to steam which reacts with the silicon to form an inert film of silicon oxide.

From here on, processing the wafer consists of photographic and chemical reactions on the top surface, with a film of silicon oxide protecting each layer.

Each IC begins with the designing of the circuit and its reproduction on a set of acetate masks, much like negatives. The masks are about 400 times the dimensions of the final circuit so they can be fashioned to an accuracy of ten-thousandths of an inch. Through the masks, the surface of the silicon is exposed to ultra-violet light and the resulting pattern etched out. Dopants of either type are then diffused into these crevices. The whole process is repeated in succeeding steps.

Finally, the wafer is split into its several hundred individual chips for testing, attaching of lead-in connections and encapsulation in metal or plastic.

The whole process is carried out in an ultra-clean environment that would put a hospital to shame. Workers wear lint-

free gowns and use automated equipment, microscopes, vacuum pencils and similar apparatus to turn the silicon into space age chips. A smear of perspiration from the fingertips or a speck of dust would be more massive than one of the working sections of an IC.

Already, integrated circuits are doing their stuff for the military.

Pictures of the surface of the moon taken by the Apollo astronauts were beamed back to earth through ICs. Eighty per cent of the electronics in this pint-sized camera, which operated in the vacuum environment at temperatures ranging from +250 to -300 degrees, consisted of integrated circuits.

The multi-circuits have been woven into electronic systems for several aircraft, air-to-air missiles and a worldwide, high-speed military communications system. Rugged dependability and infinitesimal weight have made ICs suitable for electronic equipment carried or worn in the field by ground troops. In rocketry, where every pound saved means a saving of \$20,000, the size of micro-circuits can be fully appreciated.

For industry, Westinghouse is producing numerical control systems using ICs which offer computerized operation of small milling machines, automatic punches and complex triple-axes positioners. This system does the same job with fewer than one-fifth of the 11,000 components and 30,000 connections in older transistorized units.

The tiny squares of silicon have displaced mechanical, hydraulic and electric device in such areas as industrial processing equipment, appliance controls and even slot machines.

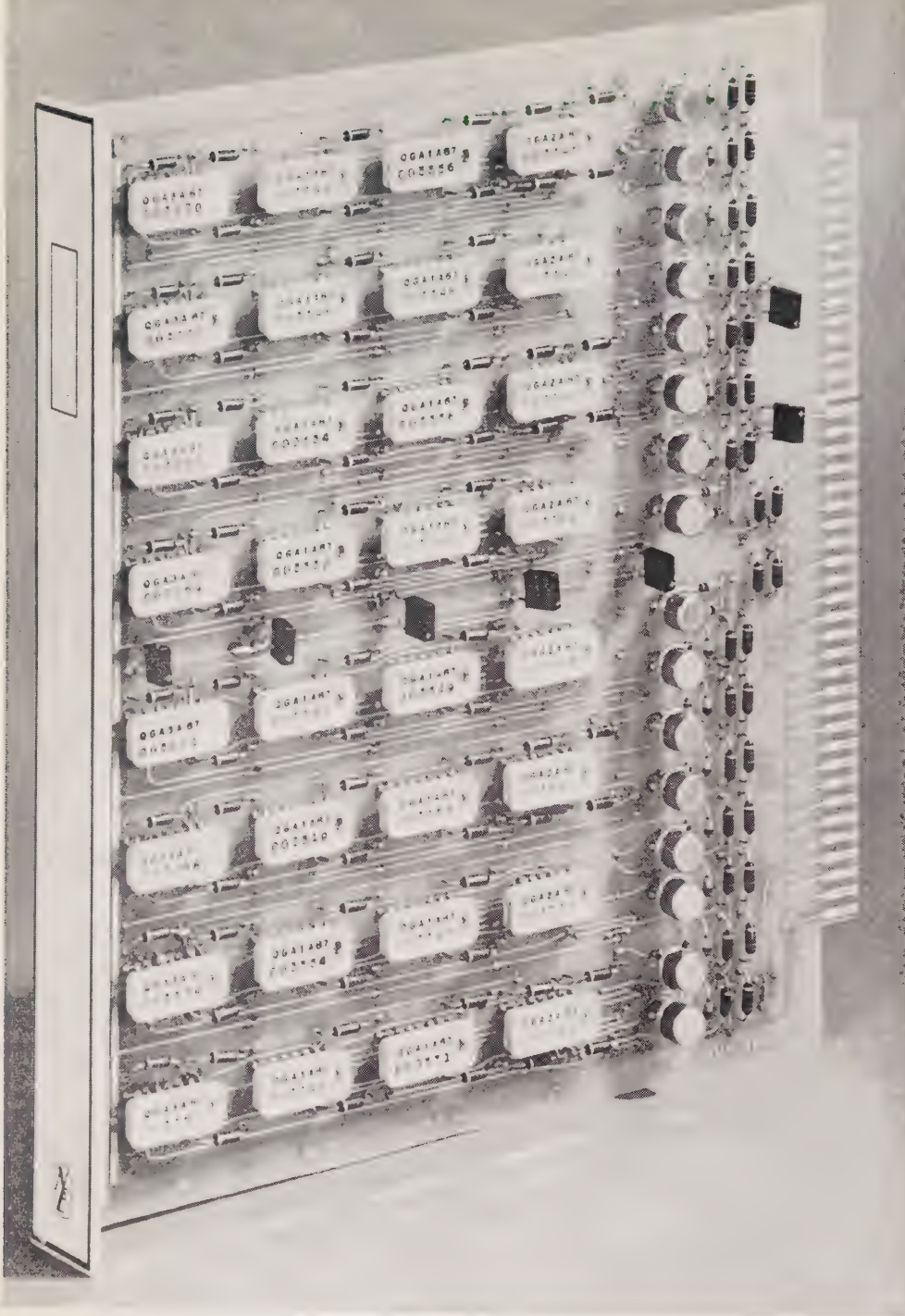
Micro-electronics has just begun to move into the consumer field. Last year, record players, television sets and other home entertainment equipment made by several manufacturers emerged with integrated circuitry.

As the president of one electronics firm says: "Micro-electronics will make possib









*An electronic system built of myriad components like this one can be duplicated through large scale integration on a chip no bigger than the Northern Electric symbol in the bottom left hand corner.*

newspaper, see-the-other-party telephoning and radio and TV entertainment by laser beam.

While the third generation of electronic devices has hardly got its foot into the householder's door, a fourth generation already beyond the drawing board stage.

Labelled Large Scale Integration (LSI for short) this latest breed of electronic circuit takes the integrated process one step further by creating a complete electronics system or sub-system on a single slice of silicon. This dispenses with the need to "dice up" the wafer into chips and place them in separate packages.

As with integrated circuits, the advantage lies not primarily in a reduction of size, but in a reduction of the number of interfaces between different materials. Thus the reliability and speed of a system are beefed up.

At Northern Electric Laboratories in Ottawa researchers are in the forefront of LSI technology. It is now in the exploratory stages and they say it will be several years before it reaches the production phase. A major limiting factor at the moment is the less than perfect yield that is an inevitable gremlin in semi-conductor manufacturing. Northern is using an approach called Redundancy Adjustment of Probability. With this approach, more circuits than required are built on the silicon wafer in such a way that good circuits can always be found ready for connection to the system.

Ian A. Davidson, manager of Exploratory Microcircuit Development at Northern, says LSI "promises to add an entirely new dimension in the world of communication

"The trend in this fourth generation appears to be toward more and more complexity — more electronics in a smaller space," he says. "The effect on communications equipment will be to make it cheaper, with more functions. For the consumer, LSI will bring complex electronic systems into the home — hands-free communication, automatic bill-paying and automatic reading of hydro, gas and water meters as a start."

Scientists foresee LSI circuits with as many as 1,000 transistors with their associated resistors and diodes on a single silicon slice. Such is their potential that two of these slices, with a total surface area of one square inch, could handle all the switching for an entire telephone exchange. □

totally new products that are now too complex, too unreliable, too difficult to maintain and too expensive."

Dr. Edgar A. Sack, general manager of the modular electronics division of Westinghouse in the United States, predicts that by next year 25 per cent of the integrated circuits produced will find their way into consumer goods.

His company has already built a two-way wrist radio and a television receiver the size of a cigarette box.

One particularly attractive candidate for ICs is electronic safety equipment for the

automobile. Engineers are thinking of a "black box" that would help drivers stop in the shortest possible distance without skidding, and a radar-like device that would warn the driver whenever he is approaching another car at a dangerous closing speed.

Other possible integrated circuit devices are a flat TV display that would hang on the wall like a picture, a personal alarm system, a mini-radar for blind people and communications innovations that will bring to every household the morning



Topics ran the gamut from heavy water to electric cars. But the pervading theme at the 60th annual meeting of the Ontario Municipal Electric Association and the Association of Municipal Electrical utilities was regional government, and how changed boundaries will affect utilities large and small. The course of action hammered out by delegates may well have a profound bearing on their future.

# year of decision

## **Bid to chart own destiny**

In two long and heated sessions on regional government, delegates hammered out a course of action which may determine the future form of local Hydro systems in the province.

The association, in conjunction with the local Hydro commissions concerned, will study and recommend to the Minister of Municipal Affairs the kind of electrical distribution system best suited to any area where regional government is to be implemented.

This decision took the form of a motion by the association's Government Legislation Committee and was approved by a large majority of delegates after lengthy debate.

"In concert with the commissions in the affected areas," the motion says, the

association will "work to reach an accord with Ontario Hydro so that the OMEA may recommend to the Minister of Municipal Affairs what it considers to be a workable plan for the distribution of electric service within a regional form of government."

Delegates were informed of the events leading to this course of action at special sessions presided over by the chairman and two members of the Legislation Committee. They explained how the association executive had met with Municipal Affairs Minister Darcy McKeough in January to present a brief on regional government and a statement of policy.

This action had been taken without the approval of the general membership, the committee stressed, only because of the urgency of the situation. It had originally



been planned to meet with the Minister after the convention.

Committee chairman D. G. Hugill, Sault Ste. Marie, told delegates it had been assumed regional government would be introduced on a wholesale basis across the province as were the area boards of education.

"We began receiving warnings and advice from various places in the province," he said, "that it might be unwise to wait until the annual meeting . . . the multiplicity, the urgency and the sincerity of these warnings caused the committee to seek an interview with the Minister at the earliest possible date."

Mr. Hugill suggested that the Minister's response had come as a surprise on two counts: first, that the government was not yet prepared to make any recommendations as to the form Hydro should take under regional government and, secondly, that one uniform system of electrical distribution might not be the answer in every instance.

Delegates were told that the Minister had suggested the association study actual conditions in the Ottawa-Carleton and Lincoln-Welland areas, seek accord with Ontario Hydro and submit a workable plan which could form the pattern for local Hydro in regional governments across the province.

While the final vote was almost unanimously in favor of the Legislation Committee's proposal for regional studies, several delegates took exception to the committee's method of approach. They thought the meeting with the Minister could have waited until after the convention. Others were for maintaining the present status quo at the municipal level and opposed any form of regional government involving the Hydro utilities. □

## Heavy water vital to nuclear program

Ontario's nuclear power program looks bright although one of the problems is going to be obtaining sufficient heavy water, said Ontario Hydro Chairman George Gathercole.

He said that Canada's first heavy water plant at Glace Bay, Nova Scotia, was far behind schedule and a second plant in the Maritimes was slightly behind. Work had just started on a third heavy water installation being built by Atomic Energy of Canada at Douglas Point, on Lake Huron.

Hydro's heavy water requirements will be large, said the chairman. The initial loading for the Pickering station called for 1,700 tons and the large Bruce plant at Douglas Point, which will be completed between 1976 and 1978, will require a further 2,400 tons.

"The only existing and accessible heavy water manufacturing capacity — in the United States — is limited. Thus we must rely on Canadian enterprise to meet our needs. If our nuclear program is to proceed on schedule, it is imperative that heavy water be available," said Mr. Gathercole. Turning to marketing, Mr. Gathercole said the Hydro family must be in a position to fully utilize new facilities when they come into service.

He said he occasionally heard suggestions from both inside and outside Hydro that the commission should "ease off and catch its breath."

"The supply situation, I know, has been cause for concern. But tight periods occur over relatively short time-spans and — most important — we have gotten over the peak."

"In case anyone thinks we 'have gone about as far as we can go' in the words of the song, let me cite the example of a well-known enterprise in the United States — the Tennessee Valley Authority," he said.

TVA residential customers consumed whopping 12,700 kilowatt-hours compared to the Hydro customer average of 7,200 kilowatt-hours, and the United States average of 5,800 kilowatt-hours. The Authority's rates were one-half the average in the US, and were among the lowest in the world for a diversified electric utility.



*Most of these AMEU committee members were to present reports at an opening business session. But time ran short and only about half of them spoke.*





George Gathercole

"While high consumption is not the sole reason for this happy state of affairs, it is an important factor. In many towns and cities in TVA's operating region, more than half the homes are heated by electricity.

TVA's system has load characteristics similar to our own and a climate of widely fluctuating temperatures. Its achievement demonstrates the economies of increasing consumption, and offers a target to shoot at," he said.

Mr. Gathercole told delegates that the repercussions of the Ontario Hydro Employees' Union strike would be felt for many months. □

## Cool Hydro" bid scotched

OMEA delegates shot down in flames a lengthy resolution calling for consideration of a slowdown in Hydro's rapid rate of expansion.

The resolution failed to get a mover or seconder until two delegates stood up and made clear they would do so just to get it on the floor.

Andrew Frame, of Burlington, led the pack on what he called the "most important resolution on the floor." Although he removed its adoption, he made clear his position and expressed surprise that it could even be presented.

Mr. Frame said he was disturbed by the implications of the resolution in "slowing expansion."

"How are we to control growth?" he asked, adding that it was Hydro's job to supply power where and when it was needed. "We are darn proud we have continuous expansion in Ontario," he said.

Urging rejection of the resolution, Mr. Frame said that despite problems such as

the rotating strike against Ontario Hydro, "we are going to provide every kilowatt-hour the province needs."

Dr. J. E. Wilson, a former OMEA president, said the resolution might have been "proposed by the gas company," and urged its rejection.

The resolution, put forward by District 4, was heavily defeated by a show of hands. It was opposed by the resolutions committee as being contrary to utility experience in Canada and the United States.

The resolution said in part:

"Be it resolved that the OMEA and the HEPC of Ontario be asked to consider the advisability of slowing expansion to a more manageable rate of load growth during this period of high interest charges with a view to holding consumer retail rates at those recently set as a result of increased charges from the HEPC of Ontario to local commissions."

Delegates carried only four of the 14 district resolutions presented at two controversial sessions.

Seven resolutions up for consideration were defeated and three were withdrawn or referred to committee. Several resolutions were criticized for the lack of research.

One of the resolutions crushed was a proposal calling for recognition of Hydro linemen as a trade under the apprenticeship branch of the Ontario Department of Labour.

It was heavily defeated after a lengthy discussion in which J. R. Philips, OMEA president, said its adoption would show a "lack of confidence" in the AMEU. He said he was prepared to accept the AMEU position that linemen training was "well in hand."

Anthony Green, chairman of Oakville PUC and a former lineman, distributed a seven-page statement supporting the resolution and was granted permission to read it although he ran over the five-minute time limit.

Mr. Green said the lineman training program was in "a state of confusion" and charged that a letter written by Ontario Hydro on the subject was "pure hogwash."

He contended that the lineman training program should be operated by the Department of Labour — "where it belongs" — to meet the needs of utilities.

He said there was a "real shortage of linemen in Ontario," wages of linemen were increasing utility costs, and he expressed concern about lineman safety.

The resolutions committee opposed the resolution and E. C. Nokes, OMEA secretary-manager, read a statement endorsing the AMEU training program, which began last year at the Hydro training centre near Orangeville.

In the discussion, a North York delegate said his utility was not short of linemen.

In fact, there was a waiting list. Another delegate said lineman courses should be kept under the control of the Hydro organization.

Delegates defeated the resolution despite suggestions that it be sent to committee for further consideration.

A District 1 resolution which protested alleged discrimination against electricity by the Ontario Housing Corporation was carried by a large majority.

Delegates approved the proposal despite a recommendation by the resolutions committee that it be deferred.

Mr. Nokes said the committee feared the move would prejudice the "real progress" made by Ontario Hydro and the AMEU in gaining acceptance of electric heating by the OHC.

However, one delegate claimed that if gas were installed in a home with a long-term mortgage, the owner would be unlikely to change and he felt he would be deprived of a choice between various types of energy.

Also passed were amended resolutions calling for the free exchange of information pertaining to sales policies and techniques for the disposal of surplus electrical equipment between Ontario Hydro, the regional offices and the public utilities; a continuing close liaison between the Ontario Electrical League and the National Research Council to ensure adequate insulation standards for electric heating and calling on each utility to send six copies of its annual report to the OMEA-AMEU Public Relations Co-ordinating Committee. □

## Hails electric car in clean air drive

Electric cars and plug-in parking are just around the corner according to Toronto Hydro general manager Harry Hyde, member of an AMEU-sponsored panel of six experts examining the problems of pollution.

Mr. Hyde said electric cars and trucks would eliminate 60 per cent of urban air pollution. He predicted they would carry batteries that could be plugged into rechargers at parking meters.

Mr. Hyde called for further development of the electric transportation concept to include highway vehicles. He said there is no reason, with today's advanced technology, why batteries could not be perfected to power huge transports able to travel 1,500 to 1,600 miles before a recharge becomes necessary.

On the subject of noise pollution, A. T. Edwards, of Ontario Hydro's Research Division, said that if noise levels were permitted to grow at their present rate, normal



conversation would become impossible in the next two to three decades.

Mr. Edwards said anti-noise measures Hydro is pursuing include baffling the hum from transformers and muffling the exhaust of excess steam used for cooling turbines in giant thermal-electric generating stations.

Hydro General Manager Dr. J. M. Hambley introduced the session. He pointed out still another popular type of sound pollution—the music blaring from radios and television sets.

Another panelist, D. K. Gillies, Ontario Hydro's senior meteorologist, said the time

certain criteria which must be met to clean up the air in large cities and to maintain the cleanliness throughout all Ontario.

"Legislation, however, can do little without the co-operation of both industry and society. During the past few years society has been alerted by news media and later by political pressure to the need for a change of attitude."

D. S. Caverley, general manager of the Ontario Water Resources Commission, charged that industrial waste was the largest single polluter of the province's water resources. Pressure must be brought against industry to halt this pollution.

## New boundaries biggest concern

Half a century has passed since a young man of 20 left his native Lindsay to enlist in the Royal Flying Corps and become part of "the Great War."

But before he could get into the thick of it, the armistice was signed in a railway car outside Paris. And although one of the fields where he was learning to fly still exists as Base Borden, the other—Armo Heights—has long since disappeared under the onslaught of Toronto's urban sprawl.

The youth, Henry Baldwin, never did learn to fly. However, that mode of transportation still remains one of his favorites.

In his new job as president of the Ontario Municipal Electric Association, Mr. Baldwin will get plenty of opportunity to get into the air. He will be covering enough ground, attending district meetings and other functions, to take him across the continent two or three times.

Adjusting the ever-present pipe, Mr. Baldwin singles out regional government as the most important area of concern with which he and the association will have to deal during the next 12 months.

"I didn't agree entirely with the brief presented to the Municipal Affairs Ministry by the executive in January," says the new president. "Particularly the part which laid down how electrical service should be set up in the new regions."

"I feel that every one of the new areas will be different and each will require a different set-up. It's not just right to take Hydro down to one system. Perhaps flexible is the best word to describe the approach I think the OMEA should adopt."

He points out that the OMEA will have to work in close co-operation with the provincial government, the AMEU and Ontario Hydro in finding the best possible solutions to the problems spawned by regional government.

Says Mr. Baldwin: "Regional government cannot help but make the OMEA stronger. While it is true the number of commissions and commissioners will be reduced, utilities will be larger and the men heading them will have strong voices in the affairs of Hydro."

The new president first became a member of the Hydro family in 1948 when he was elected to the Oshawa Public Utilities Commission. He's been chairman on eight different occasions and vice-chairman five times.

"Interest in municipal utilities and the incentive to stand for office came naturally—my brother was a commissioner in Windsor for 20 years," he adds. Mr. Baldwin, whose wife died in January, has a son, Norman, who is vice-president of



*Packed gallery listens intently to the debate*

has come when man must stop engaging in chemical warfare against himself. He said that polluters range from smokers, who pollute themselves—and others—to the largest smelter or thermal generating station with multiple stacks discharging pollutants high into the air.

Mr. Gillies said the Ontario government enacted legislation in 1967 establishing

Salesman Curtis Carpenter told delegates that 250 electric toilets which incinerate human waste are being tried out in Northern Ontario cottages.

He predicted a time will come when there will be water pipes leading to homes, but there will be no need for sewer pipes leaving them. □



# THE NEW PRESIDENTS



Henry Baldwin

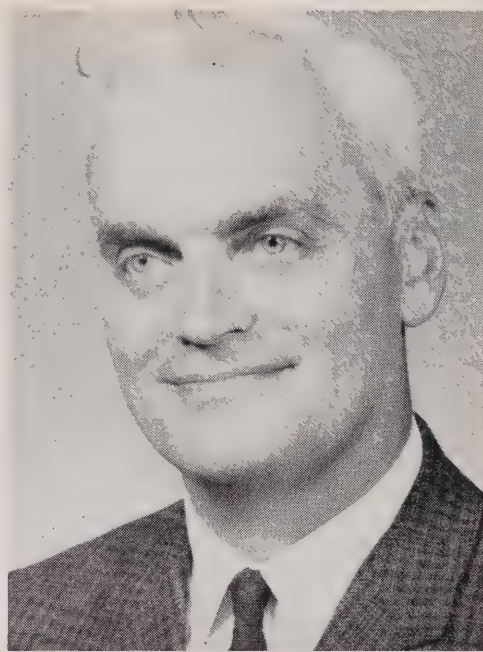
based near Albany, New York. The company makes heavy equipment for paper manufacturers.

When asked about his own occupation, Mr. Baldwin jokingly maintains he's "unemployed." But a huge gold ring on his left hand gives him away. As anyone in Oshawa can tell you, the ring denotes a long-time employee of General Motors. Mr. Baldwin retired five years ago as head of the automotive giant's parts and accessories department after a 45-year career. Oshawa itself has changed considerably since the new president took his seat at the commission table. For one thing, the population has tripled, with over 77,000 people looking to the utility not only for their electric service but also for water and transportation.

"Transportation isn't a money-maker," says Mr. Baldwin, "but I regard it as a service to the community, just like fire, police or the library."

Curling in winter and baseball in summer take up his leisure time. Mr. Baldwin is past-president of the Oshawa Curling Club.

Over the years he has served as president of District 1 of the OMEA and on several committees at the provincial level. He is at present a director of the Ontario Electrical League. Outside the electrical industry, he is a member of the board of referees for the Unemployment Insurance Commission and a director of the Ontario Municipal Water Association. □



Jack Anderson

## Livewire boss from "Tomato Town"

Representatives of 12 municipal utilities met at a quiet ceremony in Leamington just under two years ago and put their signatures to the province's first co-operative agreement on electrical sales.

Since then COMPEC—the co-operative marketing plan for Essex County—has proved an unqualified success, sweeping away a conglomeration of varied promotion policies and boosting sales. So much so that a similar pact has been signed in the Oshawa area and a third is being considered for Lambton and part of Elgin County.

It was the livewire Leamington utility, a bit of an electrical swinger, that really got the COMPEC ball rolling. And it is Leamington's able and equally swinging manager, Jack Anderson, who this year assumes the leadership of the province-wide Association of Municipal Electrical Utilities.

Mr. Anderson took over the administration of Leamington PUC in 1958 after a stint with Ontario Hydro's Western Region. It's a quiet enough town (present population 9,800) surrounded by fertile farmlands and depending for its mainstay on the food processing industry.

Fresh from London with his wife and two daughters, the new manager started

off on the right foot. He built himself an electrically-heated ranch-style house—the first all-electric home in the district. "I installed baseboard heaters and did all the wiring myself," he recalls.

Actually, it was the war that got Jack Anderson started in the electrical business. He began his working life as a clerk with a firm of London printers, but two years later he was an RCAF radar officer. He saw service in Britain, North Africa, Sicily and Italy and was discharged late in 1945 with the rank of flight-lieutenant.

"While in Europe I was attached to the RAF and later to the USAF," he says. "Our job was to guide night fighters into attack in coastal areas."

Mr. Anderson's wartime experience persuaded him to make a career of electrical engineering and he enrolled at the University of Toronto on his return home. The war also had another profound impact on his life—matrimony. He and his Scottish wife, Wynn, were married in Dundee in 1943.

During his time in Leamington, the self-styled "tomato capital" has enjoyed steady growth. There's been a major \$6 million expansion of the giant Heinz plant there and industry has diversified somewhat with the introduction of a piston manufacturing company and a firm of tobacco processors. About 30 new homes are added each year, approximately one-third of which are all-electric. And this in an area where the competition from natural gas is fierce.

Mr. Anderson feels that the AMEU will continue to be active in such urgent issues as air and water pollution and that it will continue to push for standardized working methods wherever possible.

Mr. Anderson has played an active role in the AMEU over the years. He has held various offices with the executive of District 8 culminating with the presidency in 1963. He has served on a number of AMEU committees at the provincial level, was co-chairman of the OMEA-AMEU Public Relations Co-ordinating Committee in 1967 and also acted as secretary of District 8 OMEA in 1961.

Leamington's water supplies also fall under his jurisdiction and Mr. Anderson has been secretary of the Union Water System Advisory Committee since its formation in 1961. This committee provides local supervision over a regional water system embracing six municipalities and one district industrial customer. He was a director of the Western Ontario Water Works Conference in 1961 and secretary-treasurer of Western Region of the Ontario Municipal Water Association last year.

It all amounts to an impressive list. But then Jack Anderson should make an impressive president. □



# along hydro lines



## Doubling up

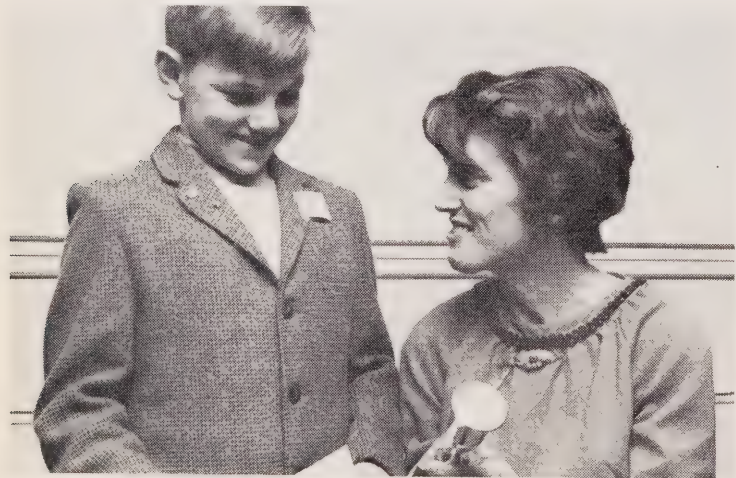
Although a shovelful of earth has yet to be turned, the capacity of Atomic Energy of Canada's heavy water plant at the Bruce nuclear complex has been doubled. Acting Energy Minister Otto Lang says the yearly capacity will be 800 tons instead of the 400 tons announced originally in December.

He says the new capacity is necessary to meet the increasing needs of Canada's power production and prospective foreign requirements. The doubling will cost an additional \$50 million, bringing the total heavy water outlay to about \$115 million. Construction of the plant is scheduled to start this year with completion in 1972 and full production within 24 months.

Heavy water is an essential part of Canada's nuclear program. It is used as a moderator and in the heat transport system of the Canadian reactor. The adjacent 3,000,000-kilowatt Bruce nuclear power station will require an initial 2,400 tons of heavy water. □

## Just like mom!

Young Ian MacGregor finished second best in the elementary section of the Ontario public speaking contest in Toronto last month and in so doing pulled off a remarkable coincidence. His mother had won the same prize in the same contest 25 years before.



*Like mother, like son*

Ian, the 13-year-old son of a Colborne farmer, was the only boy in the elementary finals, which were won by another 13-year-old, Joanne Gainer, of Rouge Hills. Betty Ann Brown, of Gorrie, came third.

Girls heavily outnumbered the boys in all three classes of the contest. Stella Petrone, a grade 13 student at St. Joseph's Girls' College in North Bay, walked off with the top prize in the secondary school impromptu speech class. The only male champion was 15-year-old Gordon Vickruck, of Port Arthur, who took top honors in the secondary school prepared speech division.

Secondary school winners received \$300 in prize money, large and small trophies and a scroll of merit. In the elementary contest the cash prize totalled \$200. A large and small trophy and scroll of merit were also awarded.

Second place runners-up in the secondary school prepared and impromptu classes were Brock Laing, 18, of Bala and Robert Haines, 18, of Port Arthur. In third place were Jack Bullock, St. Catharines, and Richard Kersey, 18, of Ottawa.

Second place secondary contest winners went home \$250 richer, with small trophies, and the second runner-up in the elementary contest took home a small trophy and \$150. For third place, secondary school contestants went home with \$150 and small trophies and the elementary third place finisher took home \$100 in cash and a small trophy. All 39 contestants received a scroll of merit. Ontario Hydro Chairman George Gathercole made the presentations.

More than 350,000 students from across the province took part in all phases of the contest, now in its 43rd year. The competition is co-sponsored by the Ontario School Trustees' Association, Municipal Councillors' Association and Ontario Hydro.

## New to the northwest



*Don Cliff*

D. H. "Don" Cliff has been appointed consumer service and sales engineer for Ontario Hydro's Northwestern Region with headquarters in Port Arthur. He succeeds K. N. Bodkin, who became manager of the region in February.

Mr. Cliff is a graduate of Queen's University in electrical engineering and has been with Ontario Hydro for 18 years. His service includes consumer service experience at Elmira, Kitchener, Hamilton and the Head Office in Toronto. Since February 1965, he has been consumer service superintendent in the West Region at London.

## More zeros

During 1968, electrical utilities in Ontario recorded more zero accidents than in the previous year. And when you're talking safety, the more the better. A total of 124 of the 182 utilities reporting to the Electrical Utilities Safety Association went through the year without a compensable injury.

These facts and others were revealed at the OMEA-AM 60th annual meeting where EUSA president J. L. Tron presented low accident frequency awards in three categories. North York Hydro took home the over 250,000 man-hour award with an accident frequency of 11.61 in 775,099 man-hours. Oakville PUC took home the middle category award with no compensable injuries in 133,128 man-hours. In the smaller utility group (under 60,000 man-hours), Preston PUC was the winner with a zero frequency in 39,063 man-hours.

Brantford Township Hydro, Richmond Hill Hydro and Leamington PUC each recorded their 10th accident-free year. Others to note were Newmarket Hydro and Dresden Utilities Commission with zero frequency in nine years and Port Hope Hydro drawing a blank in seven years.

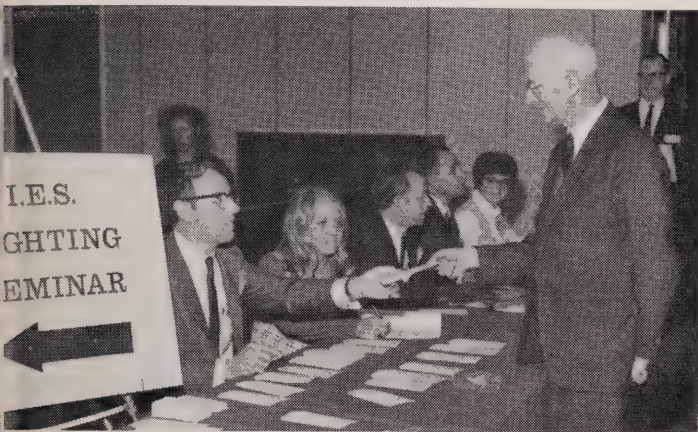
To arrive at the frequency figure, the number of compensable injuries is multiplied by 1,000,000 then divided by the number of man-hours.



## ighting the way

ighting seminar entitled "Today's Challenge in Lighting" was nsored in Toronto last month by the local section of the minating Engineering Society and Ontario Hydro. A record 0 IES members, architects and consultants jammed in to hear ee experts from the United States.

Each speaker covered a topic. One, called "Research Points the y," dealt with past and present research into reflected glare, er people's seeing problems and future improved lighting level ommendations. The second, "Experiences with Really Effective hting," examined the experiences of users. "Team Work in lding Design" closed the session with a look at major environ- ntal factors, optimum use of energy and visual-thermal comfort.



inar sign-in

egistering for the seminar is G. Franklin Dean, past president IES and retired Toronto Hydro lighting engineer. Similar inars held at Hamilton and London the same week drew ally good attendance. □

## ick pedalling 50 years



Hodgson

It's a far cry from pedalling a bike around town at everyone's beck and call to being honored at a dinner thrown for long-service employees. But the memory of his days as a junior clerk with Toronto Hydro's appliance department flooded back as Russ Hodgson received the VIP treatment at the utility's Quarter Century Club banquet last month.

Mr. Hodgson, who was presented with a gold watch, is the fourth Toronto Hydro employee to attain 50 years' service. He

ed from his job as supervisor of the Wiltshire Avenue water ter plant in February.

burteen employees who joined the system a decade later e presented with 40-year pins. And six relative newcomers n 25 years behind them were welcomed into the club.

pronto Mayor William Dennison, who sits on the commission, nted out that Toronto Hydro had played no small role in ing the city achieve greatness. "Not only have we prosperity e great growth in Toronto, but low Hydro rates throughout ario have been responsible for development in many sections his province," he said.

r. Dennison said that the city's prosperity made it virtually ssible to find a vacant store in Toronto. And the trend when ole went to enjoy themselves in Buffalo had been completely rsed. Now people travelled from Buffalo to Toronto.

esentations were made by Toronto Hydro Chairman John echan. A short progress report on the utility was given for

the benefit of retired members by General Manager Harry Hyde. "We are very much alive," he told them.



Something to sing about

Shown singing to the music of accordionist Nancy McCaig are 25-year members Ross Mighton, Mary Davidson and Lloyd Small. □

## College champ

Lon Patterson, a "Fort William Times-Journal" columnist, reports that Confederation College, one of the new community colleges, is the all-electric champion of Northwestern Ontario. It takes more than 20,000 kilowatts to heat, light and supply motive power to the new school.

"What this consumption amounts to is one-fifth of the generating capacity of Ontario Hydro's coal-fired Thunder Bay generating station on Mission Island," says Mr. Patterson.

He says that only a few years ago the plant was referred to publicly as a white elephant. "It will have to be enlarged one of these days and Hydro officials were far-sighted enough to look ahead and provide for expansion," he adds.

The station's capacity can be increased 10 times. □

## Eager beaver



Scoop of the year

Nicknamed the "eager beaver" by her editor, Mrs. Helen C. Gillies, Wasaga Beach correspondent for the "Stayner Sun," has been named 1969 winner of the Ontario Hydro Award of Merit for excellence in rural news reporting. James A. Blay, Hydro's director of public relations, presented the award at the Ontario Weekly Newspapers Association convention in Ottawa (above).

In addition to reporting for "The Sun" for 10 years, Mrs. Gillies covers the Wasaga Beach area for the Collingwood and Midland weeklies and Barrie radio and television stations. □



# municipal briefs

**George Boucher**, who served Paris for 30 years as PUC manager and then as a commissioner, has died. He attended the OMEA District 5 meeting only two days before his death. Ken Mills, a local insurance man, has been appointed to fill Mr. Boucher's unexpired term on the commission. In the last election, Mr. Mills polled the most votes of candidates not elected to the PUC.

**William M. Hogg**, of Sault Ste. Marie, president of the Great Lakes Power Corporation, has been presented with a medal by the Association of Professional Engineers of Ontario. Called the Sons of Martha Award, it is presented for "having served in the profession diligently for many years." The "Sons of Martha" is a poem by Rudyard Kipling written as a tribute to persons who work hard.

**North York Hydro** has undergone a major reorganization. Announcing the change, which involved creating six divisions, Donald K. White, who has been confirmed in the post of general manager, said the increasing size of utility operations had dictated the new approach.

Men from the present staff were picked to head the six divisions.

Emmett M. Campbell has been appointed treasurer and is also responsible for supply and warehousing; Donald McKee was named director of operations; the post of chief engineer went to Leslie J. Clare; Alex Christie was made director of consumer service; general counsel Fredrick J. McMahon took on the additional duties of corporate secretary and Donald E. Graham was promoted to personnel director.

**Popping buttons** at Deep River Hydro can readily be forgiven. The utility boasts a per customer monthly residential consumption of 1,002 kilowatt-hours — well above the provincial average. Manager Bob Spence puts it down to an active sales promotion program coupled with a favorable rate structure. Electric heating has been the subject of heavy promotion since 1962. Last December, the utility hit an all-time peak of seven megawatts.

**One of the best-known municipal utility men**, R. S. "Smoke" Reynolds, is hanging up his spurs. After four decades as manager of Chatham Hydro, he retires May 1. Mr. Reynolds will be succeeded by Clayton L. Leach, who has been assistant manager and has 20 years' service with the utility. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Public officials who respond to news media inquiries with such comments as "It's none of your business" are finding themselves in a minority these days says a new handbook, "Public Relations for Hydro Utilities."

The handbook, which has been distributed to every municipal utility in the province, says that responsible reporters take the attitude that news media represent members of the public who are unable to attend commission and other meetings. Organizations who wish to use their local news media to communicate with the public take this into account. The co-operation and respect of newspaper and broadcasting personnel cannot be won by today-we-talk, tomorrow-we-don't techniques.

A meeting in Espanola recently was typical of the interest in local hydro commissions are taking in public relations. Commissioners from five local hydro utilities reviewed their experience in dealing with the public. Employees, they noted, are as important as, but distinctly different from, the news media. In the communications process, customers can be compared to, contrasted with, municipal council. Each of these groups has different needs and different interests. In deciding to share their solutions, these commissioners are setting a fine example.

Some years ago, St. Thomas PUC ran a series of newspaper advertisements on their meter readers. A head-and-shoulders photograph of each man, together with his name, was accompanied by a policy statement from the utility emphasizing the interest in serving customers with courtesy and thoughtfulness.

No doubt other utilities have also published similar advertisements. It was St. Thomas' experience, however, which prompted the PR Co-ordinating Committee to produce and distribute an advertisement "the footprints in your tulip bed belong to somebody else" along with six other advertisements in a package designed for use by any local utility. Staff courtesy is a vital ingredient in maintaining good relationships with customers. PR-mindedness should be encouraged to run like a blood stream throughout all levels of the organization.

Highlight of a PR display at the recent OMEA-AMEU convention in Toronto was a scrapbook of local utility pamphlets produced during 1968. Almost equally divided between annual reports and explanations of their service policy, the material gave utility officials a chance to compare appearance and content of their own pamphlets with those of other utilities.



PR on display

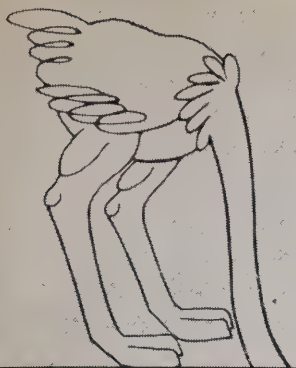
Reflecting interest in the exchange of such information, the convention delegates approved a resolution from Northwest Ontario calling on each utility to send six copies of its abbreviated annual report to the PR Committee. These will go on display at next year's convention.

### February energy production

Primary energy provided by Ontario Hydro in February totalled 4.94 billion kilowatt-hours, an increase of 2.3 per cent over the same month a year ago. For the first two months of 1969, the total is 10.47 billion kilowatt-hours, up 5 per cent over the same period last year.

Adjusted for seasonal influences, primary energy demand in February was 4.87 billion kilowatt-hours, 2.3 per cent less than the previous month. The seasonally adjusted total for February represents 58.45 billion kilowatt-hours at annual rates. This is 420.2 per cent of the energy demand in 1949. □





## as don wright sees it

spring, gardening and other innocuous outdoor activities are the kind of fancies likely to occupy the minds of men relegated by the passage of time to interests other than the antics of the birds and the bees. And so we'll have a few words to say about the latest kind of landscaping — even if it is performed indoors.

We refer, of course, to the landscaped office which is very much of an "in" thing among motivational researchers, designers, industrial psychologists and other folk who manage to make a good living on the strength of their titles. Down with partitions is the gist of the thing and flexibility is the excuse. The landscaped office puts upper and lower echelons in one open space and, instead of partitions, makes use of plants, shrubs and other mobile impedimenta to delineate individual work areas. One expert defines the landscaped office as "a fluid form of activity" that uses rugs and lighting to differentiate space. Such toys as special ceilings and lack of flat surfaces ensure "acoustic privacy".

Democratic and all as the concept may be, we have our reservations. No fern or potted palm can possibly ensure the privacy necessary to appease those highly private, hard-to-reach places that need scratching from time to time. Nor has the ceiling yet been designed which can absorb the kind of explosive epithet many of us are inclined to release on occasion, during the course of a bad day.

Other kinds of office appointments are equally controversial. Views differ, for example, on the mini-skirt and whether or not it stimulates production — or simply stimulates.

One Toronto authority thinks minis are "the kind of distractions that should be provided in an office".

Another, who calls himself "psychiatrist and environmentalist", insists that a desk "should not expose teasing legs".

We go along with the latter fellow only if he refers to the legs of the desk itself. Oaken limbs, such as the ones upholding our own Early American-type working surface, should be strictly functional and discreetly concealed.

Generally, though, we do hold with the psychological environmental behaviorist (arts graduate) who lambastes executives for measuring their worth by the size of their offices. "It's a sad thing," he says, "when you have to show your authority by the space you take up."

That's why we have always insisted, quite successfully we might add, that the Commission provide us with the barest minimum of space — bearing in mind the room required for the full swing of the typewriter carriage and a modest reserve for personal expansion that seems likely to occur with a good appetite and advancing years.

Quite aside from the psychological impact, there are other advantages to this sort of accommodation. Floor covering is a case in point. Pot holders are cheap and come in a variety of attractive colors so that we can change our wall-to-wall carpeting two or three times a year.

Visitors are no problem. Fitted with a cushion, an open desk drawer provides adequate accommodation for droppers-in and discourages time-wasting chats. It's ideal for eyeball-to-eyeball editorial interviews.

Only once have we found this compactness any sort of a drawback. That was during the assembly of certain items such as typewriters needed to establish temporary press facilities at a convention. Two of the movers attempted to make off with our office on the ridiculous assumption it was a packing case.

We still like partitions but pooh pooh one eminent Toronto designer who says "people would rather earn \$90 a week at the Toronto-Dominion Centre than \$100 a week in a lesser office".

And another who allows as how management will have to "rediscover the motivators; they will have to examine jobs for the amount of psychological income they provide".

Man, no — the old fashioned kind of income is good enough for us.

■ All in all, the field of business psychology is mad and merry. Take that mid-western company president who installed a row of bicycle exercising machines in his office. Subordinates entering the office are expected to join him on the machines and pedal like crazy during the full course of the discussions. The object here is to discourage lengthy meetings while promoting physical fitness among the upper echelons.

Americans, incidentally, are expected to spend more than \$50 million this year on treadmills, indoor jogging machines, stationary bicycles and other contraptions designed to make them uncomfortable. As much and more could be achieved with a pair of old running shoes and a suit of long underwear, but as one prosperous manufacturer of exercising gimmicks chortled: "People have a great desire for things they don't need. It's marvelous."

■ In spite of it all, we do manage to make some progress. Among the signs of the changing times is a new company set up recently to supply nuclear fuels. It will be ready for business by the end of the year and expects to be going full blast by the early 1970s. Its shelves will be stocked with such exotic items as enriched uranium oxide powder, zirconium and fuel-assembly hardware.

Time was when fuel dealers contented themselves with coal, wood and coal oil and maybe handled blocks of ice to keep things going during the summer.

■ Speaking of ice, we're indebted to Highway Safety News for some handy tips on how to use ice cubes to treat minor injuries and irritations. They can be used to numb fingertips prior to the removal of slivers, relieve backaches due to

muscular strain, stop bleeding and dull the sting of minor burns.

And some of us will find therapeutic value in the mere contemplation of ice cubes cavorting in certain environments. Add them to a few ounces of alcohol, for example, top off with a carbonated beverage, and they can provide a fascinating subject well worth protracted study. Drain and refill the glass often enough and the performance of the cubes is almost certain to defy many of the laws of physics right before your eyes.

■ But do so at your own risk. A South Carolina senator is presently introducing legislation requiring that a health warning be printed on the labels of all liquor bottles. The warning, patterned after cigarette label requirements, would read: "Caution, consumption of alcoholic beverages may be hazardous to your health and may be habit forming."

He may have a point but let's not overdo this protection by legislation kick. Soon we'll be tagging everything from motor cars to miniskirts with danger signs.

■ Closer to home, they're putting more sting in the highway traffic regulations by greatly increasing the fines for a wide variety of misdemeanors. It's reassuring, though, to realize that things were even tougher away back when.

"In ancient Nineveh," according to Westinghouse News, "where roads were sacred, posts were placed along the processional way inscribed: 'Royal Road. Let no man lessen it. For this way it is decreed that anyone who parks a chariot or other vehicle along the road shall be slain and his body impaled on a stake before his house.'"

This, it seems to us, is going too far for a parking offence. It should only be considered for unnecessary horn blowing and for changing lanes without looking.

■ Not that modern lawmakers are always masters of logic. In Cologne, topless nightclub performers were recently granted permission to use musical instruments in their acts provided they did not play them. "To do so," ruled city council, "would violate good taste."

■ All's quiet on the labor front, as of the moment, and those 548 construction workers at the Noranda potash mine in Saskatchewan are back on the job with the return of warmer weather. They left the job earlier in protest against having to use unheated wooden outhouses in sub-zero weather. It's a case of a warm front relieving a cold backside.

And the only acknowledged case of a lock-out during the recent Hydro strike occurred in the Clinton area, near London. Staffing the office by himself, one member of management made sure the door closed snugly behind him after a lonely day at his desk. Next day he discovered he'd locked himself out.

■ It's the Stanley Cup season again and a good time to slip in a remark credited to General David Sarnoff, RCA chairman, overheard at the Super Bowl football game in Miami early this year.

"If the Chinese launched three ICBMs and we interrupted this game for a newscast," he said, "our switchboards would be jammed with complaints until they landed." □



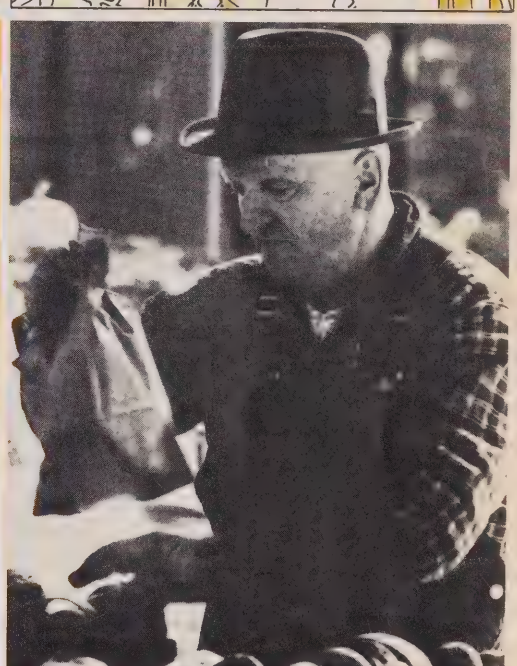
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**Follow the leader?** Not when it comes to research. And this transformer was deliberately set on fire in the quest for knowledge. Land costs being what they are, the test was one of a series designed to establish, among other things, how close transformers can be located without the risk of fire spreading from one to another. It's experiments like this that are keeping Ontario's electrical rates among the world's lowest.





- centralia socks it to 'em
- children of silence
- piped-in tv

**ontario hydro news**

may/1969





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### the cover

It's difficult to represent the entire issue on the front cover, but this month we had a good try. With everything from credit cards to cabbages, we'll leave it to the reader to sort things out.

### editorial board

George E. Gathercole, Chairman, Ontario Hydro  
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H. F. Baldwin, President, OMEA  
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## Viewpoint

# clean dirt?

About the only thing common to most kinds of air and water pollution is dirt. Waste liquids, solids and gases have been the traditional villains but nuclear radiation has since been added to the list. British Thermal Units are the latest to hit the headlines.

Concern is being expressed that the lakes and rivers of this continent may become "polluted" by the growing number of thermal-electric generating stations using them for cooling purposes. These stations recirculate vast amounts of water which is returned to the source up to 15 degrees warmer but no less clean. Some claim that as more stations are built, lake and river temperatures will rise — upsetting the balance of nature and affecting fish and aquatic organisms. Others maintain that the effects will be negligible or even beneficial in stimulating fish growth.

Whatever the situation where these plants are located on small bodies of water, there is no cause for concern in the case of the Great Lakes. Rimmed with ice each winter, these deep and ever-flowing reservoirs of cold water are too vast to be warmed significantly by generating stations planned now or in the foreseeable future.

Even the smallest in area — Lake Ontario — covers 7,540 square miles (half the size of Switzerland) and contains some 300 trillion gallons of water. Its outflow is in the order of 90 million gallons a minute. At full operation, a generating station like Lakeview, near Toronto, circulates only about 1,000,000 gallons a minute.

More controversial are the likely effects of the warm water effluents on the relatively tiny areas of the lakes in the immediate vicinities of the generating stations. Research of this nature has been scant and Hydro intends to pull its weight in a program to find the answers.

In co-operation with the Ontario Water Resources Commission and the Department of Lands and Forests, it is conducting intensive environmental studies at the site of the big coal-burning Nanticoke station under construction near Port Dover on Lake Erie. The Steel Company of Canada, a future neighbor, is sharing the cost.

Included will be a detailed look at plant and animal life in the surrounding area, water temperature studies, fish and current studies, aquatic weed growth observations and water sampling.

By the time the plant is in full operation in 1974, there will be data for comparison and a chance to chart any changes.

Limited as present information is, there is evidence to suggest that any warming effect on adjacent waters will be negligible.

Intensive studies by a team of scientists and engineers at a 1,180,000-kilowatt Lake Michigan plant of Commonwealth Edison indicate that no significant effect on the total near-shore environment could be attributed to the discharge of warmer water. Heat dissipation was rapid with higher-than-ambient temperatures confined to the upper water. No temperature effects whatsoever were detectable at a depth greater than 18 feet or at a distance greater than 2,900 feet.

Fish and algae studies at the 40-year-old station revealed no harmful effects and the dissolved oxygen content remained unchanged. This tends to confirm tests conducted last year by Hydro at Lakeview.

Hydro biologist Dr. W. R. Effer says: "Charges of oxygen depletion are often made against thermal stations but the Lakeview tests, and studies made at several other installations, have shown them to be completely unfounded."

Justified or not, concern being expressed over the effects of these big generating stations on the Great Lakes is a healthy sign. And it is reassuring to know that the various authorities are co-operating to eliminate the unknown with regard to their operation. □



# centralia wins its wings

**Squadron Leader Jack Malone left the Air Force  
two years ago. Now he's back in his old house, on his  
old base and he's still C.O.**

by Jim Etherington



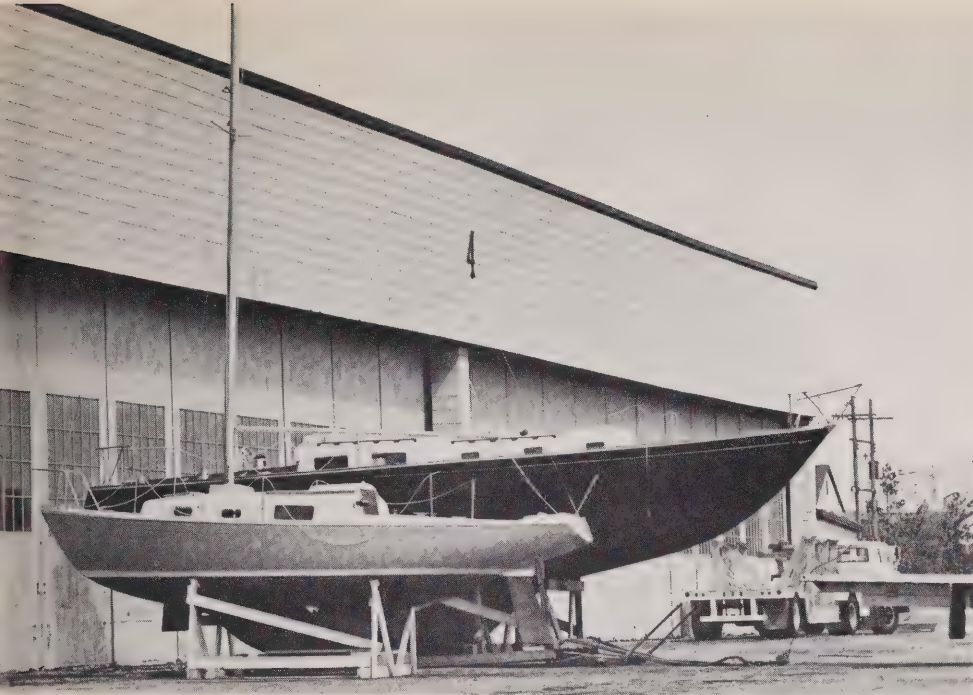


*Former CO Jack Malone stands  
in front of the control tower.*

*Businessmen find the runways  
convenient for flying visits to  
the old air base, where one  
of the main industries is a  
boat-building concern.*







*A co-educational College of Agricultural Technology was established at the former air base in 1967.*

June, 1967, Squadron Leader Jack Malone locked the door of his home at the Canadian Forces Base, Centralia, and left the 700-acre air station to gather dust.

He had been commander of the rear detachment group boarding up the 362 homes in the married quarters and deactivating the station following the federal government's decision to end flying instruction there. A year later, now a civilian, he moved back into the same house as industrial manager for the new owners – the provincial government's Ontario Development Corporation.

Jack Malone's change from Air Force uniform to a businessman's suit is a dynamic example of the re-birth of the air base, situated 25 miles northwest of London, a humming industrial centre.

Two weeks after he left, the ODC moved to begin renovations of the hangars and other buildings and to stake the provincial government's reputation on a new experiment to attract industries to the discarded station. It cost Ontario taxpayers \$600,000 to purchase the base from the federal government. And another \$613,000 was authorized for capital and operating costs during the first year of this pilot project in regional development.

Initially there had been great concern about the \$5,000,000 annual payroll kicked out of south Huron County when the Air Force left. Civilian workers were without jobs, the surrounding Stephen Township lost its tax grants and the situation looked as bleak as the grass-grown runways where thousands of jet-fighting pilots had roared faithful Harvard and Chipmunk aircraft into the skies.

"Like a desolate graveyard," was the way provincial treasurer Charles MacNaughton remembered it. The sparkplug for the purchase and development of the station, Mr. MacNaughton, who represents the riding, is all smiles at the results.

"Right now we're in a breathing period – giving ourselves time to digest what we've accomplished to date," he said. "The next step will have to be the erection of new buildings, but we want to carefully measure the full impact of what has happened at Centralia before we take that step."

What has happened is that nine industries, ranging from a manufacturer of fibreglass racing sloops to an assembler of automobile headlights, have rented space in seven hangars and some of the smaller buildings. A big boost initially was the establishment of the Centralia College of Agricultural Technology, which opened its doors in September, 1967, offering a two-year agricultural course leading to diplomas similar to those of the Western Ontario Agricultural School at Ridgetown.

Director of the new school is James MacDonald, the former associate director of WOAS in Ridgetown, and his classes will have an eventual enrolment of 400 girls and boys. The main dining hall is the posh, former officers' mess. A regional veterinary laboratory using the former base hospital was recently established at the school.

Taking over a compact, self-sufficient operation like a military base brings with it amenities not normally offered on isolated sites. In addition to the 362 homes, which are available at reasonable rents







of between \$58 and \$125 apiece, the ODC has re-activated some of the recreational facilities including the swimming pool and the arena and curling rink.

Privately operated services, such as a bank branch, a supermarket and a service station, have been re-opened (the operator had despaired of ever making another sale when the Air Force left) and a post office and a Canada Manpower Centre have also been established.

Situated close to Lake Huron, and less than a half hour's drive from London, the industrial park offers both the convenience of recreation and shopping, plus the somewhat relaxed life of country living — something the employees who moved to the base with their companies have greeted with enthusiasm.

Eventually the base, the province calculate will pump \$11,000,000 a year into the local economy, more than double what the Air Force did, and jobs for about 2,200 will be available. To date 350 jobs have been taken up, with some of the industries not yet in full production.

According to the ODC, not just any industry will do at Centralia. The ones they have chosen complement one another, avoid competition for labor among existing industry in the area and provide a healthy growth situation.

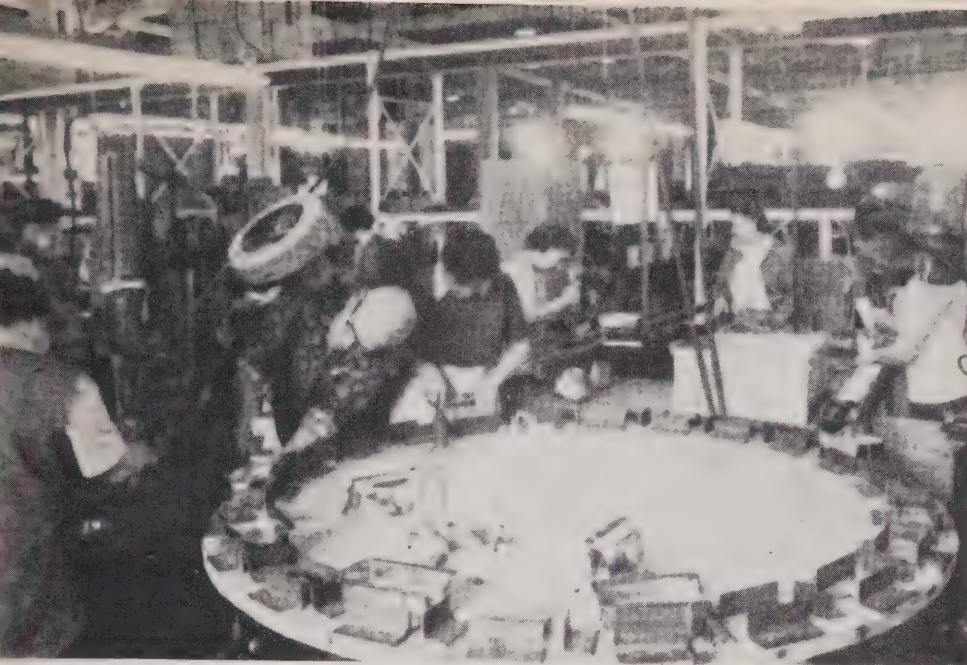
Ontario Hydro crews moved in to operate the electrical distribution system on the base (which had been installed under contract by the Air Force) and in the words of Pat Freeburn, Exeter area manager, "found it in not too bad a shape".

"But," he said, "the banking of transformers and street light controls did not conform

*The travelling trade is a big customer of Centralia industries, whether it's vehicle headlights, bicycle tires or car carriers.*







*Women predominate in the manufacture of vehicle accessories by the Hall Lamp Company.*

Ontario Hydro standards and were renovated."

The purchase of the system by Ontario Hydro from ODC is being negotiated. Freeburn said Hydro did not adopt a large-scale program of upgrading services, but rather is working toward providing service as it is required by each new industry.

He noted that the base now has a load demand of approximately 1,500 kilowatts, which exceeds the nearby town of Lucan. Despite a change, he remarked, from the years after the Air Force left and the power demand dropped to 152 kilowatts.

The advantage to the area will be the lowering of electrical rates for the village of Centralia. The load demand will give them an urban rate compared to the existing rural rate schedule.

The management of the industries themselves have nothing but praise for the development. Howard and Peter Hughes, whose building company was the first to settle in a hangar, say sales have gone up 100 per cent since they had room to stretch in the cavernous hangar (it still sports the warning "Watch Wing Tips" on the doors). Their firm brought 22 families with it from Toronto and has employed about 20 local workers.

The industries range from the large to the small. Dunlop Canada Limited moved its Chemline Services division to Centralia a year ago and ran a CNR spurline into the hangar to allow tank cars to be lined with rubber for the transportation of explosive chemicals. The company also has its bicycle tire and tube division there. Conveyor Canada Ltd., which builds small highway transporters for new cars,

started as a one-man operation. William Green was manager and the only employee for several months. He single-handedly built his first trailer then left for England to bring out his family. Up to a dozen employees will now be hired as he swings into production.

Now open again is the 17-room public school built in 1952 to serve children of Air Force personnel. Mothballed when the Air Force left, the school has now been purchased by the Stephen Township board and put back into service.

Reminders of the former owners remain everywhere, of course. The entrance to the base is still controlled by the gatehouse, "and the industries like it," said the gateman, who directs visitors around the large site.

The control tower and the runways are still there, but not unused. Several of the companies either have their own aircraft or have aircraft drop in from their parent companies on occasion. The ODC hopes to attract an air charter service to operate the field again.

Other industries include Ferro Plastics Associates; Acme Neon Signs (London) Ltd., which moved to the base attracted by the lower taxes and ready labor supply; Space-Pak International Ltd., a producer of pre-fabricated homes; Daymond Industries Ltd., which produces plastic plumbing, and the Hall Lamp Co. of Canada Ltd., where lighting equipment for cars, trucks and farm tractors, and a variety of accessories are assembled.

Eventually the company will employ about 200, most of them women and, incidentally, wives of men attracted to the other industries.

Economics and Development Minister Stanley Randall sees the base as a successful experiment that could be the pattern for similar developments elsewhere in the province. Obviously, he said, there aren't too many places around with the facilities of Centralia, but the expansion of the ODC to handle Centralia can be turned to the assistance of other areas in Ontario.

The nearby town of Exeter is definitely feeling the impact of the base. Some merchants report sales up fourfold and a new spirit of activity.

William Smith, a member of the town's industrial commission, said that rather than siphoning away all available labor and making it more difficult for the town to attract industry of its own, the reverse is true.

"Our young people do not have to move away to find careers in the trades now," he said. Mr. Smith is hopeful that allied industries not large enough to interest the ODC will settle in Exeter where the enthusiasm of municipal officials and businessmen is so great they are talking about building a small industrial mall themselves.

A prime agricultural area, the region is now enjoying the benefits of a regional agricultural school. Periodic courses are offered to farmers, and their sons now have the opportunity to study agriculture and still help out on the farm.

To critics who question the wisdom of placing industries artificially in a region, Alan Etchen, co-chairman and managing director of the ODC, says "sour grapes". "There are lots of industries that will still want to go to a place like London," he said. "But with our help, other industries that are crying for readily available labor and lower taxes will find Centralia ideal."

All government spokesmen tend to remain cautious about what has been achieved in the quiet countryside industrial park, but they agree the pattern has been set for future regional assistance.

"Everybody said we would fall flat on our face," said Mr. Etchen. "Well, all they have to do now is go up and look for themselves." □



# shattering silence of the deaf

by Harriet Law



To most people music means listening, or foot-tapping, or dancing. But to Jonathan, who is five and deaf, music is mainly a sensation transmitted through an amplifier strapped neatly across his chest and felt, perhaps, as a vibration in his body or detected through the button-like receiver in his ear.

Jonathan is the statistical one-in-8,000 in Ontario handicapped by deafness. His

teachers believe that it is he who must adjust to the hearing world — and not the other way around. And so he was embarked on a difficult course at a very early age: not only must he learn to read lips and understand what people say, he must also learn to speak when he has never heard the spoken word.

Normal children of Jonathan's age have a vocabulary of about 2,000 words.

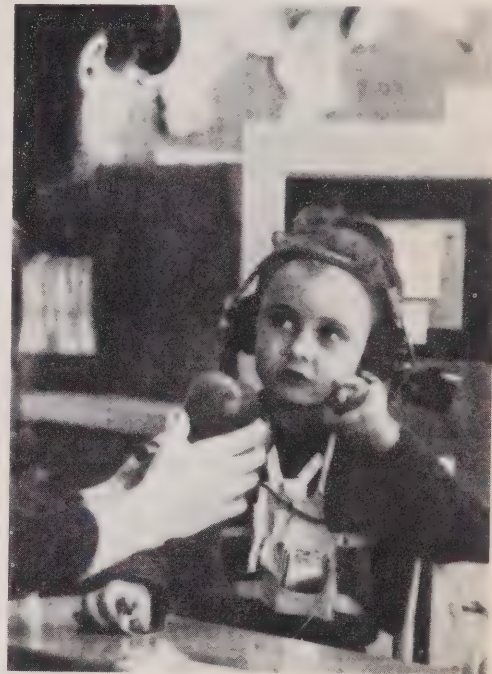
Jonathan has no vocabulary at all. He has what the specialists term "profoundly d

To help Jonathan in his monumental task of learning and speaking a language, there are highly specialized teachers (but not nearly enough of them), medical and psychological specialists and teachers, and hearing equipment aids for individual needs. In Ontario, there are also three schools to choose from. Two are day-





*Electronic aids play a major role in the education of deaf children. Musician is the work of a student at the Metropolitan Toronto School for the Deaf after a visit by part of the Toronto Symphony Orchestra.*



idential, which means Jonathan may have to leave his family and familiar surroundings and make a new home for himself at an Ontario School for the Deaf in Milton or Belleville.

The third school is a day school unique in Canada. It is the Metropolitan Toronto School for the Deaf, and it shares a building with Davisville Junior Public School. The MTSD encourages a program of modified integration of its students with those at the public school.

"The benefits work two ways," says Miss Margaret Grant, principal at MTSD. "Students at Davisville Public School use hearing equipment, use home economics kitchens and even learn to cook or sew right alongside our deaf children, who are also learning self-sufficiency. The hearing children learn, in an incidental way, to accept the drawbacks of communicating with a deaf child. And the deaf child learns a little about communicating in a hearing world."

What is the purpose of a day school for the deaf? The MTSD prospectus says it is threefold. Firstly, the school staff aim to educate the deaf child to the limits of his capacity. Secondly, they hope to teach him how to get along well with other people so that he can adjust to a hearing-talking world which has little understanding of his problem.

The third purpose involves the specific need of the deaf child — to give him a language which will not isolate him from his fellow human beings. Before any school subject can be taught, says Miss Grant, ways of communication must be established. Oral speech of an intelligible kind is, however, the most difficult of all goals for the deaf child.

Nevertheless, Miss Grant is a determined exponent of the oral approach to language learning for the deaf, as opposed to "signing" or sign or manual language. With the help of hearing equipment, students are expected to develop lip-

reading skills and a spoken language at the earliest possible time at all these schools. However, W. K. Clarke, Ontario Department of Education administrator for the residential schools for the deaf, points out that "signing" is an expedient to which the deaf will usually resort in order to communicate with each other.

Manual communication for the deaf is discouraged because of two serious drawbacks. It isolates the deaf person from the hearing community whose members have never seen the need to learn a language used by one per cent of the population. And, secondly, sign language was originally designed by a Frenchman and consequently suffers the syntactical oddities of a translated language. Signs represent concepts or ideas rather than grammatical forms.

"When this language is put into writing by a deaf person," says Miss Grant, "it becomes almost as incomprehensible to the hearing person as the signs themselves.





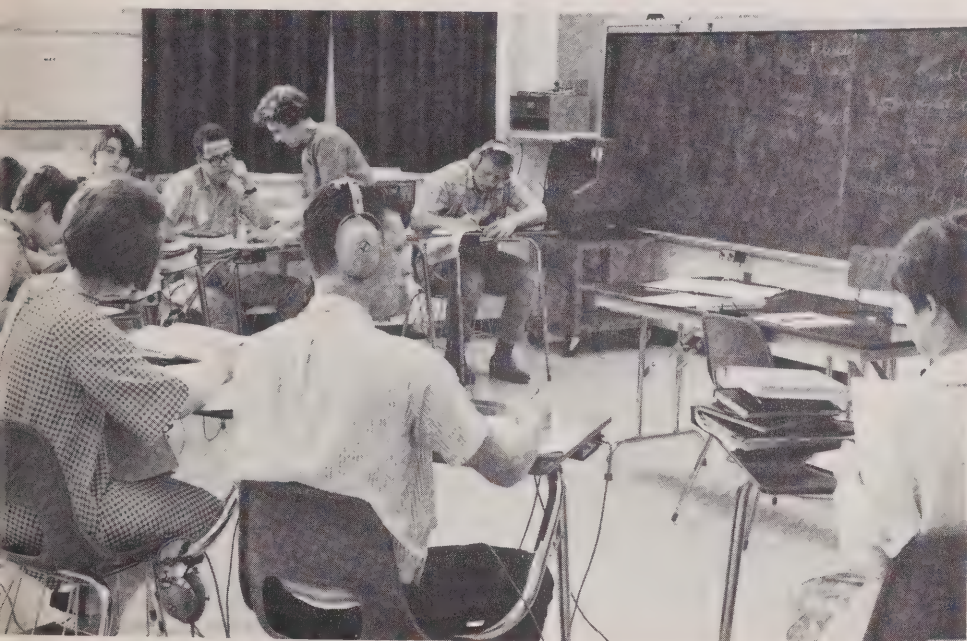
*Coordination is part of the learning process for deaf children. Vibrations from the piano are a musical experience to students.*







*Three special schools provide top notch education for the one in 8,000 in Ontario handicapped by deafness. An audiometer helps determine the extent of a child's hearing loss.*



ning, in effect, encourages the isolation which the deaf person already finds himself because the hearing world simply doesn't understand him."

lism is admittedly a tortuous and e-consuming task for both teacher and student. Learning to achieve a rhythmic tech pattern is a first step. The easy v of speech found in quite young ring children is developed only rarely he deaf child, although present wider of hearing aids is making it more sible.

aid in speech development, especially n young children, all three schools uently use an induction loop system. ically, the teacher's voice is converted electronic signals that are carried hugh a wire loop in the floor, ceiling or ls. Special hearing aids enable children in the loop to pick up whatever iments of sound their particular pattern hearing will allow. Such systems give ngsters freedom of movement because

they do not have to be "plugged" into the loop. On the minus side are the narrower range of sound and problems of interference and distortion.

For classroom instruction, older students wear headphone-type hearing aids. Each student plugs into his desk receptacle, which is connected to an amplifier linked to the instructor's microphone. Jacks are located at the blackboard so that a student can leave his desk, do blackboard work, and still be plugged into the system.

With hearing aids children often learn to distinguish sounds, but it is the low tones which are most likely to be received. Sometimes the sounds seem to be localized in various parts of the body.

When a group of musicians from the Toronto Symphony Orchestra were asked to perform for the children at the Metropolitan Toronto School for the Deaf, it was the brass section, with its low-range instruments, that was chosen. During the performance a 10-year-old boy smilingly

patted his stomach as the vibrations of the huge tuba reached him.

Illustrating the application of response through vibrations and rhythm perception by the deaf, one teacher asked a 12-year-old boy to identify a number from one to 100. She then turned her back, to prevent him from lip reading, and with the aid of his amplifier he was able to successfully identify "se-ven".

The emphasis on movement and dance is important to deaf children as a means of developing speech fluency. In the auditorium at the MTSD a loop system aids in getting the beat to the youngsters. Under the guidance of Lois Birkenshaw, the children get training in body movement and response to language and music. The instructor uses single and double syllable words, which they are taught to recognize.

Not only does dance and creative movement help the deaf in language development, it helps to give them more self-confidence





*Classroom work and a play — oriental in origin — provide students at the Ontario School for the Deaf in Belleville with knowledge to meet the hearing world.*

in their physical actions. Because the deaf cannot hear the world about them, they may experience anxiety about their physical safety, especially when people or machines suddenly loom up beside them. Classes in dance and movement help them overcome feelings of insecurity and fear.

Deaf children do not all share the same kind of hearing loss. One means of diagnosing the extent of a child's handicap is the audiometer. This electronic device creates sound frequencies which are transmitted through earphones. An indicator registers the levels of frequency the child indicates he is receiving. These responses are graphed and the resultant audiogram becomes a guide for teachers. Testing is carried out at regular intervals throughout the child's stay at school because hearing losses may change.

Sometimes a child will surprise the specialist testing him. One child's audiogram indicated profound hearing losses, and yet he was able to communicate, while

another child with a little more hearing ability was unable to communicate at all. It is at this point that other specialists — doctors and psychologists — will examine the child to discover what other handicaps he may be suffering.

At present, a little more than 20 per cent of the students at Milton and Belleville are "hard of hearing" rather than profoundly deaf. Mr. Clarke agrees that it is preferable for these students to be going to day schools and living at home. Unfortunately, there are not enough day classes where they can get the expert teaching and training they require.

Ontario's schools for the deaf are trying to keep up with innovations in teaching. De-emphasizing vocational education as the only goal for the deaf is one of the ways in which administrators think they can help their handicapped students keep pace with the 20th century. As a result, they have encouraged their pupils to apply for entrance to the world's only liberal arts college for the deaf — Gallaudet

College in Washington, DC. Nineteen former Ontario students are now at Gallaudet.

In Toronto, a planned program of integrating deaf students of high school age has been in progress. Five classes for the deaf are operating in four Toronto secondary schools, with students spending part of their time with hearing students. Last year at Milton, two senior girls attended Milton District High School for classes in mathematics, science, and English.

At a recent convention of the Alexander Graham Bell Association, students from classes for the deaf at Toronto secondary schools acted as registrars for delegates doing typing and obtaining information orally from about 400 educators from across Canada and the United States. "One must listen attentively to understand their speech," said one delegate, "but one must listen with care the speech of a Northumbrian, a Texan, or even some 'Tronta' citizens." □



# market day in cabbagetown

**Bargain hunters no longer get cold feet.**

by Gordon Murphy    photos by Harry Wilson

They roll in while most of the city slumbers into Saturday. Country folk in trucks that look either battered or bought yesterday, but all laden with fresh fruit, vegetables and eggs. They roll in from small farms strategically near but still untouched by urban sprawl, from the fertile flatlands of Holland Marsh and the sheltered strip along the Niagara escarpment.

And while housewives who opt for supermarket convenience are still thinking about breakfast, those who prefer to buy direct from the farmer and like to dicker a little over the price are setting off, shopping bag in hand, for Toronto's St. Lawrence market.

By 8.30 a.m., a bustling, seething, haggling throng inundates the market building. Long before noon the day's business is done, the choicest buys are gone. Only late-comers and the plainly curious remain.





*For adults it's a slice of salami,  
a taste of honey or a bag of spuds, but  
for children it's a circus of  
sights and aromas, complete  
with candied apples.*



One of the city's two authentic markets, the St. Lawrence has risen again in the downtown area long nicknamed Cabbagetown. The site was set aside in 1803 by royal decree for the establishment of a weekly market "because great benefit and advantage might be derived".

That first market was a simple one-storey frame shed on four and a half acres of land. It went up in flames in the great Toronto fire of 1849. Its replacement, constructed in 1850, consisted of a series of small ground-floor shops running between the King and Front Street entrances of the St. Lawrence Hall, focal point of Victorian Toronto's social whirl.

Those were the days of early greatness when the carriage trade (the in-group of the time) rubbed shoulders with wearers of home-spun and calico; when a lamb could be purchased on the hoof and ducks, geese and other feathered fare might be taken home live for the fattening.

Those were the days when, according to a local historian, "children who were not taken to the market at Christmas to see the decorations would have themselves not only badly used, but cruelly disappointed".

Time, and the need for more adequate quarters, caught up with the market shortly after the turn of the century. It was demolished and replaced in 1901 by a building separate from and immediately to the south of the St. Lawrence Hall.

This was the predecessor of the latest structure – a building designed to take the farmers' market into the 21st century. And what a difference from the darkness and gloom of the old market.

Gone is the leaking ceiling. In its place is a flat roof on two levels with glass in between, designed to let in the sun. Gone are the scarred and weary walls. Now one of them features a built-in waterfall, complete with colored light





*After selling a king-size cabbage, a farmwife has a minute for a bite. A sparkling exterior complements the electrically climatized interior of the new St. Lawrence market building.*



Gone, too, is the need to stamp one's feet on cold, cracked concrete to keep the circulation going.

Heating for the most part is underfoot, coming from electric cable embedded in the floor. The cable was first covered by two inches of sand, the sand by a layer of polyethylene, the polyethylene by wire mesh and the mesh by five-inch thick concrete slabs. The total effect is a "heat sink" capable of retaining warmth for a considerable length of time.

Arranged in sections, the cable is controlled by an off-peak load control device which prevents the total underfloor system from being on when the load for the rest of the building is high. The system is supplemented by heaters over doors and a number of duct heaters.

The decision to go all-electric was based on a study by a firm of consulting engineers in the comparable merits of electricity and other contenders for the heating job. Toronto Hydro's recommendation for a

radiant cable system won approval.

Significant factors in the decision were that electric cable heating requires practically no maintenance and that no chimney would be required.

That fresh, green produce which has so long lured Torontonians to the market will be preserved from wilting in summer by an unusual air-conditioning arrangement. The market has no air-conditioning machinery of its own, but it is equipped with a chiller coil, a mechanism that can be tapped into the air-conditioning system in the newly renovated St. Lawrence Hall.

Most of the lights are located above the market area on a two-circuit lighting track. One track is equipped with 400-watt mercury bulbs for brightness. The other supports 300-watt incandescent lamps to provide color correction and subdued lighting when stalls are cleared from the floor and the building is used for other purposes.

Overhead lighting is supplemented by decorative wall fixtures designed to highlight the plaster trim. The overall effect makes the building ideal for events other than the traditional market day.

For example, the market offers a good-sized stage with appropriate lighting and other essentials for theatrical and concert presentations. At the official opening of the building, Toronto Property Commissioner Harry Rogers revealed that bookings had already been made well into 1970 for events ranging from merchandising displays to political rallies, bingo and religious services.

But just as a reminder of its primary purpose, a commemorative tablet on the north wall carries a notice from the Upper Canada Gazette, dated November 5, 1803. The notice makes it plain that the ground was set aside by Peter Hunter, Lieutenant-Governor of Upper Canada, for use as a market. □



# bridging the generation gap







ant generating stations attract most of the glamor in the power business, but no less exciting is the construction of the lines of transmission line without which generating plants would be useless offices of concrete and steel.

ke this job, for instance. It's part of a 100-mile swath being bulldozed through one of the roughest terrain in Ontario. At next year it will link the province's two power networks — known as the east and west systems — and provide a direct connection between power utilities from Saskatchewan to Quebec. Apart from saving money, the ready exchange of power will help to make Northwestern Ontario independent of rainfall so vital to the amount of hydro-electric generation in the west system. Already an indirect

exchange is taking place through the privately-owned Great Lakes Power Corporation at Sault Ste. Marie.

Two sections of the line are seen under construction. Tall wooden poles are being raised into position and the crossarms attached on an 85-mile stretch between Sudbury and Algoma. An aluminum gin pole is used to raise the tall poles. This line duplicates an existing 230,000-volt circuit.

Elsewhere, steel transmission towers are being raised to support two new double circuits. Other photos show work on a wilderness strip 300 miles to the west between Marathon and the Lakehead. The helicopter is stringing a rope that will later be used to pull conductors into place. □



# cashing in

by Paul Chisholm

The Canadian family visiting Japan for Expo 70 will be able to jet there, eat there, sleep there and tour there without spending a yen. Of course, there'll be a day of reckoning for this seemingly idyllic situation. It's just that the credit card familiar to retailers and the corner gas station back home will be accepted in Tokyo, Osaka and most other centres.

A logical extension of electronic aids to modern business and banking procedures, the all-purpose, internationally accepted bank credit card is but one of several new efforts by banks to gain a larger slice of Canada's consumer credit business. Gone from banking circles — along with grey flannel managers and sombre tellers behind forbidding grills — is the tradition of frowning on overdrafts.

Now it's "instant cash" through credit cards and cheque guarantee plans. Not to mention more revenue for banks from consumer loans. Heralding what is frequently termed the cashless, or chequeless, society these credit schemes also afford banks relief from a suffocating volume of cheques, and enable paper work to be handled in more manageable form.

While predictions of the outright demise of cash are usually indulged in by science fiction writers rather than bankers, economists and sociologists, the new bank credit plans certainly make for less cash and fewer cheques.

The most ambitious program is the Chargex credit card system introduced last fall by the Canadian Imperial Bank of Commerce, Banque Canadienne Nationale, the Royal Bank of Canada and the Toronto-Dominion Bank. Devised around high-speed computers, instant-access electronic data files and high-speed printers, these cards are already accepted by more than 14,000 retail and service businesses in Toronto, Montreal, Quebec City and Ottawa-Hull.

Enabling the use of one credit card where previously a dozen or so may have been necessary, the system will eventually be extended to major centres from coast to coast. Up to the end of February, about 1,300,000 Canadians were using Chargex cards to obtain goods and services from a wide range of stores, hotels, airlines,

restaurants, beauty parlors, auto repair centres, an oil company and two large store chains.

Customers are issued cards by their own bank and sales are recorded by imprinter at the time of purchase. Each bank handles its own accounting and customers are billed monthly for total purchases. Overdrafts of up to \$1,000 are allowed under Chargex and there is no charge if accounts are settled within 25 days. After that, 1 to 1½ per cent interest is charged monthly — the equivalent of 12 to 18 per cent annually.

While it is yet to be a national service, Chargex is already international. Through arrangements with various banks in each country, the cards are accepted by 300,000 retailers and businesses in the United States, Britain, Japan, Malta, Gibraltar, Eire, South Africa and Mexico.

Bank credit cards are particularly suited to small and medium-sized businesses because they can offer credit terms to compete with larger stores. Reducing administrative headaches and the risk of credit losses, payments are credited to the retailer's account when receipts are taken to the bank at the end of each day. Retailers pay an initial \$25 fee and four to six per cent on bills presented.

The system enables the cashier to check the acceptability of the charge at the banks' data centres in Toronto and Montreal. At present a manual telephone operation, but capable of electronic refinement, the system provides pertinent information within seconds.

Direct telephone-computer hook-ups are used in some credit card systems in the US. These enable the cashier to place two cards in a touch-tone device attached to a special phone. One card dials the computer of the card-issuing organization and the second identifies the place of business. The cashier dials the credit card number and the amount of charge requested. The computer responds with an "OK" from its taped voice, or a reason for declining the charge — cancelled, card lost or stolen, counterfeit.

Bank cards which guarantee payment of cheques signed by the bearer operate more within the framework of conventional

banking practice. Typical of such cards are those issued by the Bank of Montreal and the Bank of Nova Scotia and honored across Canada and the US.

Cheques issued in denominations of \$25, \$50 and \$100 are issued under the Bank of Montreal's Bancardchek plan and the bearer simply signs them at the time of purchase. Unlike travellers' cheques, they are not paid for in advance. The Scotiabank card, with plastic-enclosed photo and signature identification, is presented with the holder's personal cheque.

Both systems broadly limit the card-carrier to \$1,000 credit at one per cent interest monthly. When cheques are overwritten, money is simply deposited the bank in the customer's account. There is no expense to businesses accepting the cheques under either plan.

According to R. A. McDougall, a Bank of Montreal vice-president, the cashless society is more or less with us now, and real evolution is likely to be the chequeless society. "Various billing systems — such as department store charge accounts — have tended to reduce the number of cheques which have to be issued. The advent of guaranteed cheque-cashing privileges and credit cards has tended to reduce further the need to use cash to settle small transactions like buying gasoline, or a pack of cigarettes, a hotel room or even your lunch," he says.

Looking to the future, Mr. McDougall foresees huge, bank-operated cash depositories consisting of myriad separate accounts for individuals and electronic transfers between accounts without the need for cheques or other intermediate documentation. Businesses and retail terminals would be wired to the deposit computers.

To further streamline billing procedures he suggests that various utilities such as the municipal electrical systems might arrange to automatically process charges through customers' accounts. "This could be done by submitting a list of customer account numbers and billing amounts to the bank, which would enter the appropriate transactions through its computer system," he adds.

As an alternative, Mr. McDougall says



Money is the poor people's credit card—Marshall McLuhan

Money is the poor people's credit card—Marshall McLuhan



Carrying the idea even further, Mr. McDougall suggests that instead of a utility giving banks a list of items prepared on its own computer, the magnetic tape could be sent, eliminating the need for paper altogether.

Consolidations of credit card systems and more inter-changes between plans will see fewer credit cards serving wider functions in the future, according to John Dougherty, manager of the Canadian Imperial Bank of Commerce credit card section. He is convinced, like Mr. McDougall, that there will always be a place for cash — if only because the clearing charges for small items such as cigarettes would be disproportionately high relative to the value of the purchase.

Developing new technology to make these innovations possible would seem to be the easier part of advancement to the cashless or chequeless society. The larger part depends upon the education of the public at large so that they will accept such systems. Somehow the stiffness of a credit card doesn't bring out the psychological satisfaction of the crispness of a dollar bill or the jingle of coins in a pocket.

The new bank plans are aimed at all income levels. With Canada's total consumer credit bill now in excess of \$8½ billion, the banks are out to increase their present one-third holding. But cash, it seems, will be around for a while yet. At least as long as the parking meter. □



# they laughed when I said it would pay

In this age of upheaval, announcement that another revolution is under way is apt to be met with a shrug. The revolution in this instance is in the field of communications. But it is evident from rumbles already registered that, for starters, the mass media — television, radio and newspapers — could be shaken to their foundations.

The hero, or villain, in the piece (depending on whether you're a producer or consumer) is cable television (CATV). And as the curtain rises, the Canadian public is witnessing a virtual stampede for stakes in this new medium.

"Two years ago they laughed at me when I said cable TV would be a big thing in Toronto."

The speaker is Ted Rogers, president of Rogers Cable TV Limited, one of the major cable companies in the Toronto area. Now Mr. Rogers, and others entrenched in the CATV field, have the laugh.

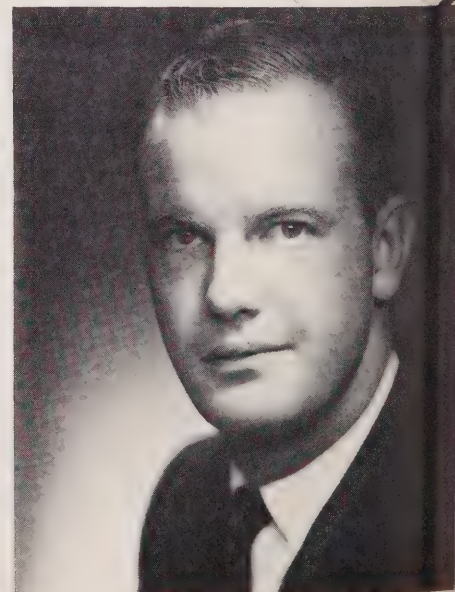
With about 75 per cent of the homes in Metro Toronto having access to cable TV, and with hundreds succumbing every week to the guarantee of better reception on more channels, CATV operators are looking ahead to wiring up all of Southern Ontario. And that, some say, is only the beginning. They foresee a vast interconnected network covering all of Canada, a possibility that is causing no end of headaches to lawyers and others concerned with the delicate issues of copyright and broadcast regulations.

Transmission of television or radio programs via cable is only the beginning. CATV, which began as an innocuous community service known as Community Antenna to improve TV reception in fringe areas and bring television to unserved areas, is now emerging in its true potential — as a vehicle for just about everything from computer data to video telephone signals and from delivering electronic newspapers to the home to the visual monitoring, control and operation of distant automated factories.

Despite its potential for upheaval, the setting up, operation and maintenance of a CATV system is a reasonably simple proposition. And once a would-be operator receives a licence from the Canadian Radio-Television Commission, it is almost certain to be a lucrative venture.

Reduced to basics, a CATV system consists, firstly, of a large antenna put up by the operator to pull in programs and, secondly, of a network of coaxial cable over which programs are transmitted to subscribers. (In the Toronto area, customers pay from \$4.50 to \$5.50 a month for the service, now available from more than 30 different companies.)

The antenna and accompanying equipment, known collectively as the "head end" are invariably located on the highest accessible hill or atop the tallest building in the community. In the case of Rogers Cable TV, it's the 56-storey Toronto-Dominion Centre, the tallest building in



*Ted Rogers*







*Laughter has turned to sighs of envy as more and more CATV antennas spring up across Canada.*



Canada. There, electronic equipment connected to a 75-foot high antenna receives and strengthens 10 different signals and feeds them into coaxial cable, where they are further strengthened every 2,000 feet by transistorized amplifiers.

The cable itself is no thicker than a pencil, yet is well insulated against electrical storms and other abnormal weather conditions. In most cases, it is strung by the Bell Telephone Company, or its equivalent in other parts of Canada. Bell has agreements with other utilities, including Ontario Hydro and the municipal electrical systems, for the use of poles where the telephone company has none.

The agreement with Bell for the use of Hydro poles was negotiated by the Association of Municipal Electrical Utilities. Bell already paid utilities for the use of each Hydro pole for telephone equipment. Now the Hydro utilities receive an additional fee per pole from CATV operators.

After getting his licence, paying for the "head" and associated equipment, buying the coaxial cable and paying Bell for stringing it, the CATV operator begins selling his service, hooking in customers to the main cable by what are known in the trade as "drop lines". If the situation in Toronto is any criterion, little is needed in the way of a sales pitch to convince the average householder that he's getting in on a good thing. That he is also getting in on a revolution, if considered at all, is secondary to the guaranteed clarity of image and fidelity of sound and the prospect of getting rid of that unsightly rooftop antenna.

Some CATV systems now have a capability of 20 channels, but most have only 12 — the maximum number of channels on the conventional TV set. The additional channels could be brought in by a converter attachment through Channel 12, now in most cases either vacant or used for radio programs or other transmissions.

CATV's promise of financial reward appears to be exceeded by the volume

of questions it has prompted, most of which are still unanswered, or perhaps are unanswerable. While it is true that television viewers have the right to the best possible reception and the maximum number of channels, it is equally true that CATV systems pull in outside stations, including US stations, to compete with local networks. That raises the question of survival, and has sent the CRTC scurrying in search of a national policy.

For instance, the many-faceted question of copyright comes to the fore in a situation where a station or network pays out a large sum of money for a program, possibly a movie, and is scooped in its own viewing area by a relatively distant station brought in by cable. And how about that arrangement with networks to black out major sporting events in the cities where they are played?

In the US, where cable TV is spreading "like wildfire" according to some reports, the Federal Communications Commission requires CATV operators to originate programs of their own and is suggesting strongly that they make vacant channels available for community improvement use. The agency has thus far kept CATV operators and conventional broadcasters off the copyright issue by ruling that CATV owners in the country's larger markets operate only with the consent of local broadcasters.

Mutterings about piracy are already being heard in Canada, and protests are certain to grow in pitch and volume as more CATV antennas pierce the skies.

The great potential of CATV and the entry of big business into the race for licences has naturally attracted the interest of municipal politicians, some solely with taxation aforethought, others with the idea of having cable companies providing a channel for local community use, including use for schools.

Some cable companies now broadcast weather reports and other information to subscribers over vacant channels, and companies in remote areas broadcast local news — a development that has caused the president of one cable firm to observe that there is a great potential for cable TV to "become the small weekly newspaper of television".

While CATV operators and conventional broadcasters appear to be headed for an eventual showdown, both systems could sooner or later be faced by a common challenge from another electronic marvel: communications satellites designed to beam programs directly into the home.

Many operators, both in conventional broadcasting and in CATV, believe that a domestic satellite is still a long way off, despite the striking success of satellites over the past several years. There are others, however, who remember the hilarity that greeted Ted Rogers' forecast of two years ago that cable TV would be a big thing in Toronto.

Satellites aside, the Canadian Radio-Television Commission is taking events as they come, searching through immediate problems for a regulatory path that would preserve the quality and content of Canadian programming.

The situation is probably best summed up by Harry Boyle, vice-chairman of the CRTC, who remarked at a recent meeting dealing with CATV licence applications that the present cable television dilemma was about equivalent to the earliest day of radio when no one knew what was happening, or what would or should happen. But he was explicit about one thing — regardless of the issues, there was gold in it somewhere. □



# along hydro ines

## Coal supply dries up

From the end of this year, Hydro will receive no more Canadian coal for its thermal power stations.

In the last decade, Hydro has bought more than four million tons from the Dominion Steel and Coal Company's Cape Breton mines, which were taken over by the Cape Breton Development Corporation in April, 1968. By cancelling the contract, which is scheduled to run until the end of 1972, the development corporation estimates it can save \$7.5 million a year. The original contract was subsidized by the federal government, but subsidies ended with the takeover.

A subsidy was essential if Cape Breton coal was to be delivered to Ontario at a price competitive with US coal supplies. The contract has been cancelled with Hydro's approval. □

## Home for 700

Ontario Hydro is building a \$500,000 homesite for 700 construction workers at the huge Nanticoke power project on Lake Erie. Phase one of the site — to house 350 workers — is due for completion next month. Phase two will be ready in October.

Construction manager George Mackie says workers will be living at the project from a considerable distance and commuting will be out of the question. The settlement will not include family dwellings. A dining hall and kitchen will also be erected. Mr. Mackie recently told local officials that Hydro wants to avoid a situation where surrounding communities would be obliged to provide temporary accommodation and eventually end up with a large number of empty dwellings. The Nanticoke units will be moved to another project when construction ends.

Already there are more than 500 workers at Nanticoke. The work force will reach a peak of 1,500 within two years. □

## Bundle of trouble

A faulty fuelling machine put the Douglas Point nuclear power station out of action last month. Fuelling of the station is carried out by two remotely-operated machines which work as a pair, one at each end of the reactor. One machine pushes fresh fuel into the reactor while the other receives the spent fuel at the opposite end.

The machines were being used to extract defective fuel bundles from the reactor when the breakdown occurred. The annual shut-down of the station for routine maintenance was brought forward to cope with the emergency. Hydro nuclear operations engineer Lorne McConnell said it would be easy to eliminate a similar recurrence. "This problem in no way influences our conceptual design of the fuelling machine," he said. □

## Radiation boxes

One hundred tons of steel fashioned into two tiny rooms provides the latest in sophisticated medical equipment to serve Toronto General Hospital and the Hospital for Sick Children. Called a whole body counter, the rooms are located in the hospitals' joint nuclear medical department.

The rooms are being used to study elements in the body such as potassium or calcium and to learn more about diseases involving the metabolism of these materials. The equipment can also be used to measure the degree of radioactivity present if a person receives accidental exposure. Cost of the entire installation was \$320,000.

Steel made prior to World War II was used in the construction because post-war steelmakers began adding minute quantities of radioactive material to keep track of the steel during manufacture. The steel is lead-lined to completely eliminate stray radiation and the unit's doors alone weigh 10 tons.

The counter is so sensitive it can pick up a person's natural radiation, enabling researchers to insert such small quantities of traceable material during experiments that there is no danger to the patient. □

## Canadian content

Ontario Hydro prefers to shop in Canada. Of about 18,000 standard items on the shelves of Hydro's supply division, only 51 are imported. So when the Manufacturing Opportunities Show 69 was held in Toronto recently, Hydro had a booth. Imported items were put on display and the question "Can you put a Made in Canada label on these?" was asked. According to Cliff Boyle, who manned the booth, a number of inquiries were made by Canadian manufacturers, but it will be some time before anything definite emerges. □

## Former director dies



Fred P. Thomas, former director of Ontario Hydro's data processing division, has died. He headed the division from 1956 to 1967.

Born in Sevenoaks, England, Mr. Thomas joined Hydro in 1948 and held the positions of research officer, supervisor and manager in the methods section and chairman of the data processing study team. He left the directorship for health reasons in 1967 and assumed the position of financial analyst, comptroller's division. Early last year, Mr. Thomas went on loan to the Treasury Board

as a senior consultant and worked as a member of a study team specializing in the application of computers in various areas of the provincial government.

He had served as national director and vice-president of the Systems and Procedures Association and was a past president of the Computing and Data Processing Society. □

## For the county

Lennox generating station is the name given to the new thermal station Ontario Hydro will build on the Lake Ontario shore at South Fredricksburg, near Bath. It's been named after part of the county in which it is situated — Lennox and Addington.

Four coal-fired units of 574,000-kilowatt capacity will power the \$278 million station. Construction of Lennox will start next year with first power due in 1974. □



# COMPEC is now COMPEC

The name's the same, but what it stands for is new. The Co-operative Marketing Plan Essex County (COMPEC for short), which was born in 1967, has proved so popular and successful that it has spawned similar plans in other areas. And the short form COMPEC has caught on.

So now the name has been changed – it's still COMPEC, but that stands for Co-operative Marketing Plan for Electrical Commissions. To keep everything straight, each of the schemes will carry a rider such as COMPEC-Essex.

Thus a new plan involving seven utilities around Oshawa is known as COMPEC-Bowmanville. Other possible co-operative areas are in the planning stages. □

## Safety stickers



Headgear heraldry

Safety decals were presented to 23 employees of St. Thomas PUC at a recent commission meeting. The decals recognized a total of 117 years of work without lost time and are presented under the Electrical Utilities Safety Association safe worker award scheme. Last year the utility had no lost-time accidents.

Mayor E. O. Fanjoy told the employees: "The type of work that the men of the PUC do is by its nature considered dangerous. I hope the safety decals will get the attention of the public so it can take your record as an example."

PUC Chairman P. R. Locke, centre, examines one of the hard hats the decals will adorn. Flanking him are six-year safety record holders Art Harris, service department; Jacob Heslinga, line department; Pat Baker, line foreman; and George Anderson, service foreman. □

## Bubble, bubble

Things are boiling at the Nuclear Power Demonstration Station at Rolphton – all to prove a point.

Scientists recently reduced the pressure in the heavy water heat transportation system and allowed the \$225 a gallon liquid to boil. They foresee a number of advantages in using boiling heavy water: thinner-walled piping can be used in the heat system; lower pumping pressure is needed; the fuel burn-up is improved and better turbine steam conditions and heat cycle efficiency are obtained.

Successful demonstration of the boiling water mode could lead to its adoption at future nuclear power stations of Canadian design. NPD was built to test and demonstrate the heavy water-natural uranium concept, but it also makes a small, but important contribution to Ontario Hydro's power network. During last winter's heavy load period, for example, the unit achieved a capacity factor of 100 per cent. □

# Ending the punched card blues

For the man who's frustrated or tempted by the "do not fold, staple, or mutilate this card" instructions on a computer bill, Waterloo is the place to live. At least as far as the PUC is concerned.

According to treasurer Don Black, the commission's new computer doesn't give a bleep whether you dunk your bill in coffee, smear it with peanut butter or roll it into a ball. Instead, the PUC retains a master card for each customer that contains all the information on a magnetic strip.

The new bills also give customers a better breakdown of electricity and water consumed along with a sewer surcharge. The PUC is collecting for the city and the service charge based on the size of water main.

Mr. Black said the new three-module computer was designed, installed and programmed by the PUC staff. It replaces a system where the billing was prepared on Guelph Hydro machinery. With about 60,000 bills to process each year, it's estimated that the commission will save about \$75,000 during the next 10 years.

## Subterranean tests

"At least partially successful" is the way the US Federal Water Pollution Control Administration describes the use of electric resistivity as a means of determining zones of underground water pollution.

A paper describing the technique used by the Administration to evaluate the method says it could provide sub-surface data at a relatively low cost when compared to sampling through wells. Areas where the experiments were conducted were known to have contaminated water and were expected to have a high degree of conductivity than fresh water areas. Problems encountered included variations in topography, variations in soil characteristics and buried conductors which rendered the data uninterpretable.

The report, prepared by a geologist, recommends further study in selected areas and in greater detail.

## Focus on school lighting

About 200 delegates from across Canada and the US are expected to attend the Illuminating Engineering Society's 25th Canadian regional conference on June 11-13 in Halifax, Nova Scotia. The theme will be "University and School Lighting".

Sessions will include such topics as: changing architectural and lighting design; campus lighting; lighting for libraries, gymnasiums and multi-purpose rooms.

## Itch scratched?

Lake swimmers may soon scratch no more. Ontario Water Resources Commission biologists believe they have found an answer to the "swimmer's itch" which plagues many bathers around the province.

More accurately known as schistosoma dermatitis, the malady is a temporary skin infection caused by the larvae of a small aquatic flatworm present in some lakes during June and July. The larvae normally infects aquatic birds and mammals in which adult flatworms proceed to develop. On man, they die rapidly and further infection does not occur.

The biologists have been using a special chemical to destroy certain species of snail hosts in the flatworm life cycle – and to break the chain. Tests conducted last summer indicate full success in relieving the itch. Effects on the fish population are considered minimal owing to dilution and the ability of the fish to move quickly away from treated areas. Further tests will be conducted this season.



## Leeds leads

A Northern England industrial city of Leeds may be the first in Europe to operate electrically powered mini-buses in a battle to quell downtown traffic congestion, noise and air pollution. According to City Transportation manager Tom Lord, prototype buses will be in operation this fall.

Under the plan, motorists will leave their vehicles in car parks on the city's outskirts and use the mini-buses to get to downtown shopping areas and business centres. To dissuade drivers from driving into the centre of Leeds, parking spaces there will be limited and rates abnormally high.

Not only do the electric buses emit no fumes, but they are actually silent, which makes them highly acceptable in city centres, and thirdly they are economically viable," said city authorities.

Built on a standard commercial chassis, the mini-buses are powered with a nine-horsepower series-wound 72-volt motor. A nickel-cadmium battery mounted between the wheels has a five-hour charge rate. Officials say the vehicles can be charged in the garage overnight to make use of off-peak power. □

## Electrical rally

Indicative of the interest in the kilowatt buggy is the holding of the International Electric Vehicle Symposium at Phoenix, Arizona, in November.

Under the sponsorship of the newly-formed Electric Vehicle Council, the symposium is believed to be the first meeting anywhere concerned with the whole range of electric vehicles. Hopefully, it will serve as the focal point for all electric vehicle work being undertaken by business and government agencies throughout the world.

The EVC is an organization of electrical utilities, battery manufacturers, electrical equipment manufacturers and other organizations and individuals interested in the advancement and development of pollutant-free transportation. The symposium will include discussions on electric passenger cars, trucks, off-the-road vehicles, transportation systems and current projects. The talks will cover the improvements in battery design and performance and the development of components for electric vehicles. A number of electrically-powered machines will be on display.

Representatives from England, Japan, Germany, Italy and other interested nations will take part. □

## And no clinkers

Britain's Coal Utilization Research Association has come up with a new type of coal-burning system that promises to revolutionize power stations using solid fuel.

The secret behind the London installation is a fluidized bed of ash for burning the coal. Gas is passed through the ash under pressure and the ash "boils" like water. Pulverized coal is then introduced and the boiling action of the ash transfers heat from burning coal to water tubes in the bed.

Extremely efficient, the system makes possible a big reduction in the size of boilers. Compared to a conventional 500-megawatt boiler using pulverized fuel and hot air as a heat transfer, the equivalent installation under the new technique would be 25 per cent smaller. Because it burns at a comparatively low temperature of 850 degrees Centigrade, there are no sticky deposits, no scaling and corrosion troubles are almost eliminated. Another advantage is its ability to utilize low-grade coal.

The association is also building a prototype power station which will not only supply steam for turbo-generators but also combine with natural gas for an experimental gas turbine set-up. As yet, no one has achieved success with a coal-fuelled gas turbine. □

## He'll wear the town crest

About 100 people including utility officials, local councillors and personal friends attended a dinner in Leamington last month to welcome J. F. Anderson as new president of the Association of Municipal Electrical Utilities. Mr. Anderson is manager of the Leamington PUC.



Handing over

He was presented with a gavel of office by his counterpart on the OMEA, president Henry Baldwin, of Oshawa. The Mayor of Leamington, Ralph Nicol, presented Mr. Anderson with a tie clip and cufflinks bearing the town's crest.

Other speakers included outgoing AMEU president Lloyd Askwith, shown above with Mr. Anderson, Leamington PUC chairman Bob Leslie and Lt.-Col. A. A. Kennedy, who as an Ontario Hydro commissioner brought greetings from the provincial utility. Replying, Mr. Anderson said the presidency was a highlight of his career. He thanked the local commission and its employees for allowing him to participate in a job which will demand a great deal of his time during the year. □

## Electric car rates—now!

No one can say Oakville PUC isn't looking ahead, or that the staff doesn't have faith in the kilowatt.

At a recent commission meeting general manager Ross Lamb presented a staff report outlining a suggested rate for energy to be used in recharging the batteries of electric cars. The rate suggested was one-eighth of a cent per kilowatt-hour. The recommendations also contained a sketch for a device that could be mounted outside homes or service stations for plugging in the car batteries.

Observing that various private companies are spending large amounts to perfect electric cars and make them competitive with gasoline-powered models, Mr. Lamb said the potential market for electricity is staggering and the early establishment of methods and rates for this purpose would act as a stimulus to the public. It would also act as a vote of confidence to companies developing the vehicles.

Suggested rates would be low, since the recharging would be done overnight in off-peak periods. □

## Big brother

When it comes to supply utilities, Ontario Hydro probably takes a back seat to only one on the continent — the Tennessee Valley Authority. A product of Franklin D. Roosevelt's "New Deal" of the 30s, TVA was modelled after Hydro and indeed seems to follow a similar pattern of growth, but on a larger scale.

At present, the Authority is in the midst of adding a mixture



of new nuclear and coal-fired generating stations that will raise its present capacity of 18,000,000 kilowatts by 50 per cent by the mid 1970s. Two new Ontario Hydro stations will do the same to Hydro's present 10,300,000-kilowatt capacity.

Nearly all TVA's new capacity will come from eight generating units of more than 1,000,000 kilowatts each — five nuclear and three coal-fired. Each has a capability larger than any unit now in operation in the world. Their combined capacity, just like Ontario Hydro's new stations, equals the total of the whole TVA system only 12 years ago. □

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## municipal briefs

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**North Bay Hydro** is well on its way to a new home. Architects have completed plans for the new building and tenders have been called. The two-storey structure will be located on property at Fisher Street and the highway by-pass. It will consolidate operations, which are scattered across the city. A lower level will have a service garage and shops while the upper level will contain offices.

**Oakville** may be the site of a second Sheridan Park — the research community located in next-door Clarkson. A land firm has purchased a 100-acre tract directly opposite the Ford of Canada plant on the Queen Elizabeth Way at Oakville. The land will be turned into an industrial park, but the land company's vice-president says it could provide sites for firms unable to locate in Sheridan Park, which is rapidly filling up. About 50 industries are expected to move in.

**Dr. J. E. Wilson**, chairman of Barrie PUC, has been appointed a director of the Ontario Electrical League. He succeeds Henry F. Baldwin, Oshawa PUC chairman. Mr. Baldwin resigned his directorship when he was elected president of the OMEA. The new director was president of the OMEA in 1966 and is a member of that group's marketing co-ordinating committee.

**Signs** on hydro poles are dangerous. That's what Bert Fleming, Hydro Mississauga manager, told the town's general committee. The subject arose from a request by council that department of works signs be placed on utility poles.

Mr. Fleming said they would be hazardous to linemen and mar the aesthetics of new pole designs. The utility safety committee, he said, is perturbed at the idea. Municipal officials say they'll try and work out another scheme.

**Listowel PUC** played host to a local OMEA meeting and made use of the occasion to show off its new building. As well as touring the office, visiting commissioners participated in a discussion on regional government.

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## speaking of pr

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*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

The phrase "Between Ourselves" suggests a frank and confidential exchange of information. Aylmer PUC selected the phrase as title for a recent series of four editorial-style advertisements in their weekly newspaper.

Each ad dealt with the subject of rates, and led the reader from a statement of basic rate principles through an explanation of demand charge to a review of how costs have increased in recent years. The reader was left with an insight into the revenue versus-costs philosophy of the Hydro system, and the distinctive feeling that he is going to hear more about rates in the near future. Creating a climate of understanding such as this can be compared directly with the proverbial application of an ounce of prevention.

\* \* \*

Lindsay Hydro heralded the approach of Easter this year with a display of building-front lighting. Not only did their efforts draw compliments from townspeople, but the display was clearly visible to students participating in the Hydro-sponsored public speaking competition held in a nearby school. An interesting combination of community projects complementing each other.

\* \* \*

Common customer complaints are hardly newsworthy, but when you write them up from the woman's point-of-view they can often take on a new look. Meaford PUC took time to chat with the woman editor of their local weekly newspaper and ended up with a fact-filled article explaining utility policy and practice in women's language. Of major interest to the ladies were appliance safety and keeping the bills down. Not a bad idea because the housewife is one of the utility's most important customers.

\* \* \*

Spring is grass and birds, year-end reports and forecasts. Several Ontario utilities have taken the latter two and developed them into newspaper stories, reporting 1968 progress and 1969 estimates to their customers. Taking advantage of the fact that annual consumption figures usually constitute a new record, they go on to comment on the expansion of the utility and the contribution it is making to the economic health of the community.

\* \* \*

Research and a little imagination can usually produce an interesting newspaper article. For starters, did you know that the average municipal residential customer in Ontario increased his electric consumption from 7,009 kwh in 1967 to an estimated 7,300 kwh in 1968?

\* \* \*

Kitchener PUC is in the publishing business. The public department is turning out a four-page "Chronicle" for customers and students. A recent issue includes a front-page story about the transmission and transformation of electricity and a photo of a lineman with an appropriate "God bless 'em" comment. Inside pages are devoted to a display covering meters and their accuracy plus jokes and household tips for women readers. And for good community relations, the back page carries an Easter Seal message from the local Rotary Club.

### March energy production

Primary energy provided by Ontario Hydro in March totalled 5.32 billion kilowatt-hours, an increase of 10.1 per cent over the same month a year ago.

For the first 3 months of 1969, the total is 15.79 billion kilowatt-hours, up 6.7 per cent over the same period last year.

Adjusted for seasonal influences, primary energy demand in March was 4.96 billion kilowatt-hours, 1.8 per cent more than the previous month.

The seasonally adjusted total for March represents 59.49 billion kilowatt-hours at annual rates. This is 427.64 per cent of the energy demand in 1949. □





## as don wright sees it

s spring again with the bird upon the wing, the bird upon the tree and the tom upon the prowl. Why is it that the banshee wail of the tomcat reaches such operatic heights at this time of the year when everyone knows he's got the time, talent and inclination to perform on a year-round basis?

Two factors appear to be responsible. One is the improved acoustics brought about by the coming of warm weather and open windows. The other is a growing sense of frustration.

As explained by a Toronto veterinarian of some prominence, the popularity of apartments over single family dwellings, brought about by rising land and labor costs, has led to a relative decline in the dog population and a sharp increase in the number of cats kept as pets.

Unlike the human male, who counts himself fortunate if he can maintain entitlement to 30 percent of a double bed, the tomcat instinctively tries to establish a neighborhood domain about two miles in diameter. He tends to become frustrated and aggressive if other males intrude.

Adding to his confusion is the growing number of "neuters" — a betwixt and between type of cat whose sexual inclinations, thanks to the scalpel, are very ill defined.

Symptoms of a tomcat suffering "territorial distortion", according to the vet, include neuroses, obsessive disorders and over-eating.

And so, if those midnight laments emanating from the back fence appear to be getting out of hand — write your local member of parliament. Heck if it all are skyrocketing land values, inflation and the capitalistic system in general.

Indicative of the degree to which we are going to the dogs is the great California catnip caper. Catnip, as most of us know, is a strong-scented herb in which cats are inclined to roll for kicks of a nature best known to themselves. A one-ounce package is enough to turn on the average feline a dozen times.

In Los Angeles, though, pet store owners have been reporting numerous requests for amounts ranging from 25 to 100 pounds of catnip per customer. Speculation has it that grassheads are smoking the stuff and in this instance, it's to be hoped they're right. Even in this enlightened age the prospect of organized roll-ins boggles the mind. Catnaps have been vying with catnip in the news lately and the case of the napless cats has been arousing considerable attention. These par-

ticular cats were deliberately kept awake for periods up to two weeks without harmful effects by the judicious application of electricity to the reticular formation of the brain.

The California neurologist who carried out the experiments reports that a steady low current (two to four volts) proved sufficient to keep the animals awake and that no increase in the dose was required as the experiment wore on. The cats were actually in better shape afterwards than the researchers who worked in shifts to monitor their behavior.

Shift the electrodes a bit and we get into the area of electrically induced sleep — a field in which the Russians appear to be leading the pack. Taken together, these developments are indeed significant. All of us may eventually be equipped with on-off buttons and automatic timing controls for instant sleep of any duration anywhere. Alarm clocks would be a thing of the past and even bedrooms would be redundant — for sleeping purposes, at least.

■ Hopheads, howling toms and four-legged insomniacs are bad enough but pole cats are a horse of a different color — in a manner of speaking. And judging from the flurry of newspaper accounts of cats making unlawful use of Hydro poles for roosting purposes, the problem is growing more serious. Considering the nine-to-one advantage the cats enjoy over their owners in the matter of lives, it's a pretty one-sided situation but this doesn't seem to discourage all manner of rescues.

One 12-year-old Hamilton youngster (we'll call him Bill) recently emerged as the neighborhood hero after rescuing a tabby trapped for five days 50 feet up a Hydro pole. Bill's procedure was ingenious and in this instance not lethal. Using a screwdriver for a weight, he looped a string over one of the lines. He then tied a cardboard box containing choice morsels of feline fare to the other end of the cord and hoisted the box up near the cat. The animal quickly leaped in and was lowered to the ground.

Sure it's simple — like Russian roulette, and with about the same odds. Try that trick with a wet string or one just damp from dragging across the grass and the results could be final.

Meddling with Hydro wires is never smart, but that won't mean a thing to the little girl who owned the cat. To her, Bill is tops and human nature being what it is there will be other heroes — some of them dead.

Cats and other pets stranded up power poles are no laughing matter to the utilities and Hydro has been scratching its collective brain for a foolproof solution. In terms of unknown quantities, the frightened feline conundrum is as complicated as the equations that split the atom.

■ Anyone who gets the chance to visit Canada's thriving nuclear establishment at Chalk River, or any nuclear power station for that matter, should make the most of the opportunity. It's a fantastic world and nuclear rubes like ourselves are likely to be most impressed by the constant and elaborate precautions enacted against the host of unseen enemies lurking about these places.

In addition to the usual industrial hazards such as a falling wrench or slippery oil patch, these people have learned to cope with such potential villains and tritium, alpha particles and gamma rays.

Routine for the initiated, the precautions taken against these ubiquitous perils never ceased to impress us during a recent tour. Ingenious detection instruments designed to strip away the deadly cloak of invisibility are the first line of defence and they are everywhere. It is weird to watch a crew of men at work while one of the group probes every inch of the area with a radiation counter resembling a zap gun. It's also strange to gaze at spent fuel bundles lying innocently at the bottom of an azure pool of crystal clear water. That 15 feet or so of ordinary water forms an impenetrable barrier against potential death rays emanating from the fuel.

On some jobs, men have been tethered to the walls in order to prevent them from stumbling or, in a moment of forgetfulness, stepping too close to a hot spot. On others, television cameras keep a watchful eye as plastic coated men get on with a repair job.

It is indeed a different world where a man's worth is judged by his Rem count as well as his technological expertise. Workers exposed to the limit of radiation, and rigidly enforced standards incorporate a wide margin of safety, obviously have less potential for work in active areas than ones with lower counts.

Even the identification badges worn by all personnel on the job serve a dual purpose. Aside from the name and photograph of the wearer, the badges carry a simple but effective film device to record any undue exposure to radiation.

Everyone leaving the laboratories is monitored automatically as he passes through the gates.

Waste disposal is also something special at Chalk River and it's amusing to see the respect accorded such mundane items as wipe-up rags and old mops from the active area. The "dump" is really more like a cemetery and highly contaminated material is interred in trenches lined and covered with thick concrete.

Nothing is left to chance at Chalk River as the safety record attests. In a quarter century of operations in a field where precedent is made rather than followed, not a single person has suffered a lost time accident due to radiation.

■ Safe as we may be from the atom, our very existence may be threatened by another form of radiation. We mean noise. Speaking earlier this year in Toronto, A. T. Edwards of Ontario Hydro's Research Division said that sound pollution, if permitted to continue at its present rate of growth, will make it impossible to carry on normal conversation in the next two to three decades. His warning was reiterated recently by a spokesman for the American Medical Association who reports that the noise level in the average American home has more than doubled in the past four decades. He hints that noise may be partly responsible for high divorce rates and nervous breakdowns.

Fortunately, our youngsters have recognized the danger and are taking precautions in the way of vigorous training. Anyone who has ventured within a hundred yards of a rock group complete with the full range of electronic amplifying equipment will understand the extent of their sacrifices. Compared with this, an old fashioned Chinese torture chamber would be downright soothing — like the muted whisper of a super jet taking off from the dining room table. □



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**Follow the leader?** Hardly. Not when huge generating stations like this must be built to meet the demands of power-hungry customers across the province. Lambton power station, near Sarnia, the latest in a series of efficient thermal-electric giants to come on line. And it's size and efficiency that are keeping Ontario's electrical rates among the world's lowest.



CA20NEP  
-A95



- electric circus comes to town
- ontario's nuclear 'package'
- teenage inventors

## ontario hydro news

june/1969





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### the cover

A new experience in sound and light, the Electric Circus, opened its doors in Toronto earlier this year. Whether its white noise, swirling colors and flashing strobes represent permanent art form or merely passing fad, only time will tell. Certainly, the circus's counterpart in New York has been a dazzling success. Now turn to page 8.

### editorial board

George E. Gathercole, Chairman, Ontario Hydro  
Dr. J. M. Hambley, General Manager  
H. F. Baldwin, President, OMEA  
J. F. Anderson, President, AMEU  
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## Viewpoint

# Tall in the saddle

Because we have never built an atomic bomb, Canada is not generally regarded as a big nuclear power. Yet, in the development of peaceful applications of nuclear science, this country stands tall among the nations of the world.

Many areas of our lives are already touched by the Canadian nuclear industry's developments in medicine, food processing and manufacturing while its prominence in the field of cancer therapy is recognized far beyond our shores.

Of even greater significance, however, is the development of the CANDU nuclear reactor, a new source of power for the production of electricity. Canada is the only country in the world with an integrated heavy water power reactor development program from basic research to commercial units.

CANDU, with its flexibility and low fuel costs, is attracting interest in a number of countries and its failure to win greater acceptance to date is due more to political considerations and other factors outside the realm of economics and technology. Its greatest immediate significance, in any event, is to Ontario.

With a relatively small hydro-electric potential remaining to be developed in the province, and the need to use outside sources of coal for conventional thermal plants, the advent of nuclear power could not have been more opportune. And the unique CANDU approach, with its capacity for variation within the theme, is likely to become the major source of low-cost electrical energy in Ontario for many decades to come.

Nuclear power is already big business in the province and, by the late 1970s, close to \$1.5 billion will be invested in nuclear generating units. These will provide power equivalent to 2½ times Canada's share of the Niagara River facilities and over five times that of the St. Lawrence.

About one-third of Ontario's generating capacity will be nuclear by 1980, which is just about the same ratio of nuclear to conventional generation which the major American utilities will have reached by that time.

Aside from the power stations themselves, the new technology will provide considerable economic stimulus in a number of areas. Most obvious beneficiary will be the uranium mines, but nuclear fuel processing is a developing industry with great promise in the export market. Multi-million dollar heavy water production facilities are also taking shape as this companion technology strives to meet domestic requirements and demands from abroad.

Extensive as the present program is, it is miniscule compared to the future potential. Between now and the year 2000, Ontario alone will require new generation equivalent to 40 Niagaras. Much of this will be nuclear.

It is predicted that nuclear reactors with a capacity of 3,000,000 kilowatts each will be producing power in Ontario by the end of this century. Apart from the economies of size, our nuclear scientists are setting their sights on greater and greater efficiency. Today's nuclear plants are competitive with other sources of power at only 30 per cent efficiency and the Chalk River scientists have set a target for themselves of 40 per cent station efficiency.

For operating and other reasons, Hydro must continue to build conventional thermal plants but the emphasis, increasingly in the future, will be on nuclear-electric stations fueled with uranium mined here in the province. It's a fortuitous set of circumstances tending to revalidate the motto chosen for Hydro in the early days of electric power — nature's gifts are for the people. At that time, of course, the gifts were the vast water power resources of the province, then thought to be virtually inexhaustible. □



# Ontario gears for 2000 AD

by Bob Morrow

"We have embarked on the greatest restructuring of local government in the history of this province. Indeed, we shall be altering a system of municipal government begun by Governor John Graves Simcoe in 1782."

— Prime Minister John Robarts.

Ontario municipalities face strong winds of change in the wake of provincial elections to proceed with regional government. At December, Municipal Affairs Minister Percy McKeough spelled out in the legislature plans for 11 regional governments in the province in the next few years in addition to the regional municipality of Ottawa-Carleton, which was set up January 1.

Since then proposals have been made in quick succession for regional governments in several areas, including Peel-Halton, York-Scarborough, and Simcoe-Niagara. McKeough has made clear that the seven regions that will dot the map of Ontario by the early 1970s are only a beginning.

"In scheduling our implementation of regional government," he said, "our approach is to concentrate on priority areas in the objective of making regional government universal in the shortest possible time."

However, Mr. McKeough has made it clear that the pace of regionalization will proceed with due regard to the social and economic conditions in any given area. The priority areas are listed in the table which accompanies this article. The first question that immediately arises is

what about Hydro in regional government set-ups?

At the moment, there are no clear answers. But by any standard of measurement, the impact on Ontario Hydro and the municipal electrical utilities will be far-reaching. The Lakehead and three other regions high on the priority list have 26 utilities. Of these, Ottawa-Carleton has the smallest utility — Richmond Hydro with less than 500 customers — and the largest — Ottawa Hydro with nearly 100,000.

Hydro's rural system with more than 540,000 customers will also be affected if, as suggested, utilities with expanded boundaries are created. For example, the dozen proposed regions are served by at least 21 of Hydro's 69 rural area offices. All but four of them are in Southern Ontario.

In some locations only a small part of the rural area overlaps the regional boundary. For example, a narrow corridor of Perth area serves part of Ottawa-Carleton, which also embraces large sections of Arnprior and Winchester areas. The Peel-Halton region would embrace Brampton area and sections of Orangeville and Guelph areas. Part of the Lakefront area would also be included, but there are no rural customers in this section.

In the quest for economy and efficiency, Hydro's rural system has already experienced substantial changes in the past 10 years. For example, the number of area offices has been reduced to 69 from 103 by regrouping and re-allocating jurisdictions. And regional government will likely bring further changes.

A potential difficulty facing Ontario Hydro is the financial impact on rural power rates if high density load areas are carved out of the rural system to be added to an enlarged municipal area.

Employees in the rural areas may also face changes. However, they need have little fear for their jobs. Addressing an Ontario Hydro area managers' conference in Toronto in March, D. B. Ireland, Hydro's executive manager — regions, said:

"Whatever the final pattern may be, you can be assured that there will still be a need for the management and trade skills of our area people — so you should have no concern in this regard. There will be the same number of customers and there will be little reduction, if any, in staff if the same high degree of customer service is to be maintained."

The pressing problem is how to fit the Hydro organization, which has served the province well for 60 years, into the dozen emerging regions. It is conceivable that all of the municipal utilities will be involved to some degree with regional government.

As a result, regional government has become a hotter topic of conversation in Hydro circles than electric heating or miniskirts.

In fact, 1969 appears to be a year of decision for the historic Hydro partnership. New forms of utilities may evolve to serve more than 2,000,000 customers in the province in regionally-oriented groups of municipalities.



## regions by the dozen



In a resolution passed March 5, the Ontario Municipal Electric Association, representing the local utilities, responded to the challenge by Mr. McKeough to make suggestions for "a workable plan for the distribution of electric service within a regional form of government." OMEA studies are being carried out in co-operation with affected utilities, particularly in the Ottawa-Carleton, Lincoln-Welland and Peel-Halton areas.

In other designated regions, such as Waterloo, Hamilton-Wentworth and Sudbury, utility commissioners are holding meetings to discuss possible reorganization.

Even utilities which are not on the regional government priority list are getting their heads together. On March 11, 35 PUC members from Huron, Lambton, Middlesex, Perth and Bruce counties met at Exeter to discuss the matter with a Municipal Affairs spokesman, who said it would be at least five years before regional government came to that area.

Elsewhere, municipal government representatives are discussing amalgamation of several municipalities in an effort to head off regional government proposals from Queen's Park.

Ontario Hydro, too, has launched an in-depth study of the wide-ranging

implications of regional government for the publicly-owned enterprise. A three-month task force has been set up to work in conjunction with various divisions and regions to help Hydro decide how to adapt to the shifting municipal scene.

A number of thorny problems face both the OMEA and Ontario Hydro, including operations, finances, rates, taxes and personnel. One important question involves the optimum size for an economic, well-run municipal utility in areas which vary in size and population.

Certainly, it's easier for larger organizational units to make use of modern



technology. Small utilities, for example, cannot justify the expense of computers and other sophisticated equipment which would ultimately lead to greater efficiency and economy of operation.

Developments in recent months have projected a sense of urgency into Hydro studies: draft legislation has been introduced into the Legislature to amalgamate Port Arthur and Fort William and annex adjacent areas to create a new city, and the Lincoln-Welland region comes into being next January 1.

In fact, the Hydro set-up which evolves in these two areas and in Ottawa-Carleton may well establish the pattern for other regions in the next few years.

The provincial government has indicated that utilities should be restricted in future to supplying electricity. At the Lakehead, Mr. McKeough has announced that telephone, water and transit services now operated by Port Arthur PUC will be operated directly by the new council of the amalgamated cities.

carried out elsewhere, this move will affect 121 municipal utilities which supply water and about 20 which have other functions, including transportation, sewage disposal, gas, telephones, parks and recreation.

Statements by Ontario Hydro and OMEA spokesmen reflect their determination to present proposals to the provincial government which, while amenable to change, will protect the interests of Hydro and its customers.

"We should have a clear view of what will best serve our present and future customers, then develop and implement policies necessary to achieve it," Ontario Hydro Chairman George Gathercole said in an address to the OMEA-AMEU convention. "At the same time, we must be flexible to change, or face the consequence of having change imposed on us."

Henry Baldwin, president of the OMEA, agrees that Hydro should take a flexible approach. "Regional government cannot help but make the OMEA stronger," he said in a recent interview. "While it is true a number of commissions and commissioners will be reduced, utilities will be larger and the men heading them will have stronger voices in the affairs of Hydro."

Hopefully, the unique Hydro partnership which has worked successfully for 60 years will emerge from regional government discussions with new strength and vitality for the future. □



*Darcy McKeough*

## Niagara

Nine municipal electric utilities and three Hydro rural areas serve a population of 331,400 in Lincoln and Welland counties, which will form the new regional municipality of Niagara next January 1.

The municipal utilities serve a total of 73,620 customers in four cities (St. Catharines, Niagara Falls, Port Colborne and Welland) and five towns (Thorold, Grimsby, Beamsville, Niagara and Fonthill). They range in size from St. Catharines PUC with 30,286 customers to Fonthill Hydro with 941 customers. Niagara Falls, with 17,645 customers, is the second largest utility.

The town of Fort Erie is served by the Canadian Niagara Power Company Limited. Rural customers are served directly by Ontario Hydro's Beamsville, Welland and Stoney Creek areas.

In the proposed regional government, the number of municipalities will be reduced to 12 from 26 in the 700-square mile region extending from around Hamilton to the Niagara River. □

## Ottawa-Carleton

The regional municipality of Ottawa-Carleton, embracing all of Carleton County and adjacent Cumberland Township, serves an area of 1,100 square miles and a population of 426,500.

The two-tier regional government, set up January 1 in the Metro Toronto pattern, includes a new 31-member regional council

and 16 municipal councils, which have the same number of members as previously.

Ottawa Hydro, with nearly 100,000 customers, serves both Ottawa and the adjacent city of Vanier (formerly Eastview). Other utilities are Nepean Township Hydro, Gloucester Township Hydro and Richmond Hydro, which have a combined total of about 18,500 customers.

Rural customers in various sections of Carleton County are served by Ontario Hydro's Winchester, Arnprior and Perth area offices.

The regional municipality is solely responsible for water supply and distribution and for issuing debentures. No change has yet been made in the Hydro set-up.

The Ottawa metropolitan area is one of the fastest growing in Canada. Ottawa's development, mainly due to federal government expansion, has spilled over the green belt originally designed to encircle the city.

The National Capital Commission estimated in 1965 that 1,180,000 people will live in Greater Ottawa by the year 2001 and that 12 new cities will likely spring up on the outer fringes of Ottawa's green belt and along the Quebec side of the Ottawa River. □

## The Lakehead

Port Arthur and Fort William municipal electric utilities will be amalgamated January 1, 1970, under legislation passed by the Ontario Legislature.

The area will include the neighboring built-up areas of Neebing and Shuniah townships served by Ontario Hydro's Port Arthur area office.

The move is a step in the direction of regional government for the vast Thunder Bay district. Further action hinges on a special government study of Northern Ontario now in progress. The two utilities, about equal in size, will have a combined total of more than 30,000 customers. Population of the enlarged city will be about 110,000.

The legislation provides for a single commission which will be appointed for the first term. It would be composed of two members appointed by Hydro, two appointed by council who would not be councillors and the mayor ex-officio. The new city council will decide, after 1972, whether commissioners will be elected or appointed. On January 1, the Hydro assets and liabilities of both utilities will become those of the new utility "without compensation".



Municipal Affairs Minister Darcy McKeough has announced that telephone, water and transit services now operated by Port Arthur PUC will be operated by the new council of the amalgamated city.

Tentative name for the new municipality is The Lakehead. □



Henry Baldwin

## Peel-Halton

The proposed Peel-Halton region, stretching from Metro Toronto's western boundary to Burlington and perhaps as far north as Orangeville, may affect 11 municipal utilities and four Ontario Hydro rural areas.

No decision has yet been reached on whether the regional government will include Orangeville and Burlington.

Other utilities involved are Oakville, Mississauga, Port Credit, Streetsville, Brampton, Bolton, Acton, Georgetown and Milton. Rural customers of the 900-square mile region are served by Brampton, Guelph and Orangeville areas.

Mississauga, Burlington and Oakville are the largest of the 11 utilities, which serve a total of about 90,000 customers.

The Ontario government has proposed a reduction in the number of municipalities to seven from 17. A two-tier governmental set-up with a 21-member regional council and seven municipal councils is proposed to govern the 400,000 persons who live in the two counties.

The new region may come into operation on January 1, 1971. □

## Regions by the dozen

By 1971, the map of Ontario will look like a patchwork quilt of new regional governments.

Prime Minister John Robarts has described the regional municipality of Ottawa-Carleton as "the first true regional government".

Here is an up-to-date report on Ottawa-Carleton and the 11 other regional governments presently proposed "on the basis of priority of need".

**Ottawa-Carleton:** Two-tier regional government was set up on January 1, 1969, consisting of regional council and 16 existing municipal councils. The region includes all of Carleton County and adjacent Cumberland Township.

**Lakehead:** Fort William, Port Arthur and parts of neighboring Neebing and Shuniah townships are to be amalgamated January 1, 1970, as first step toward regional government in vast Thunder Bay district.

**Lincoln-Welland:** New Niagara regional government to come into being January 1, 1970, embracing Lincoln and Welland counties. The existing 26 municipalities will be reduced to 12, including expanded cities of St. Catharines, Niagara Falls, Port Colborne and Welland; enlarged towns of Fort Erie, Thorold, Grimsby, Beamsville, Niagara and Fonthill; and two townships of West Lincoln and Wainfleet.

**Peel-Halton:** Municipal Affairs Minister Darcy McKeough proposed in January a two-tier regional government for the two counties and a reduction in the number of municipalities to seven from 17. The towns of Burlington and Orangeville may be included. Effective date may be January 1, 1971.

**York:** A two-tier regional government covering York County and possibly parts of Ontario and Simcoe counties has been tentatively proposed for January 1, 1971. Elimination of 10 police villages and all but five or seven area municipalities is proposed.

**Oshawa area:** Specific proposals for Ontario County and the extreme western portion of Durham County are expected within a year. A detailed study is planned for a wider area extending north to Washago on Lake Couchiching and northeast to the Lindsay-Peterborough area.

**Sudbury area:** A report on a Nickel Belt regional government study is expected in August.

**Muskoka:** Legislation based on a Muskoka district study now under way is expected this year to set up a regional government in 1970. Specific proposals are expected soon.



George Gathercole

**Waterloo area:** Specific regional government proposals are expected this year or early next year based on recommendations by Dr. Stewart Fyfe, commissioner of the local government review. Regional government may be set up in 1971 for a still undefined area.

**Norfolk-Haldimand:** A study involving both counties was initiated last March. Simcoe is the largest of nine towns in the proposed region.

**Hamilton-Wentworth:** The Steele commission on regional government has held hearings in the Hamilton area. Burlington may or may not be included when the boundary is defined.

**Brant area:** Provincial-local discussions are taking place on a regional government which may extend beyond the boundaries of Brant County.

• A special government committee is expected to report by July 1 on how regional government can be introduced in thinly-populated Northern Ontario. □



Each year, the Youth Science Foundation in Ottawa sponsors an across-Canada Youth Science Fair for student "inventors". To this fair, held in the large urban centres, come the scientifically gifted with their computers, cell cultures, accelerators, radar units or rats in a maze. They represent the sciences of engineering, chemistry, botany, physics and electronics. And they win prizes donated by local industry or scientific associations.

The contestants look and behave like the average Canadian teenager. They play cards while waiting for the judges to view their displays. They boast about the fact their project didn't blow up "like the next guy's did, because I used a fail-safe mechanism on my electrical circuit. I told him to use a fail-safe device. . . ."

But their interest in what is a difficult subject makes them a little more sophisticated after all. From the 14-year-old who built his own computer, and was awarded a special prize for being the youngest contestant in the Toronto fair, to the 17-year-old who has been given a provisional patent for his innovation in a fuel cell, the student inventors can all speak about their subject with a vocabulary far beyond that of the average teen. As one contestant discreetly put it: "You have to be careful not to bore your friends with too much detail when you explain them what you're doing. . . ."

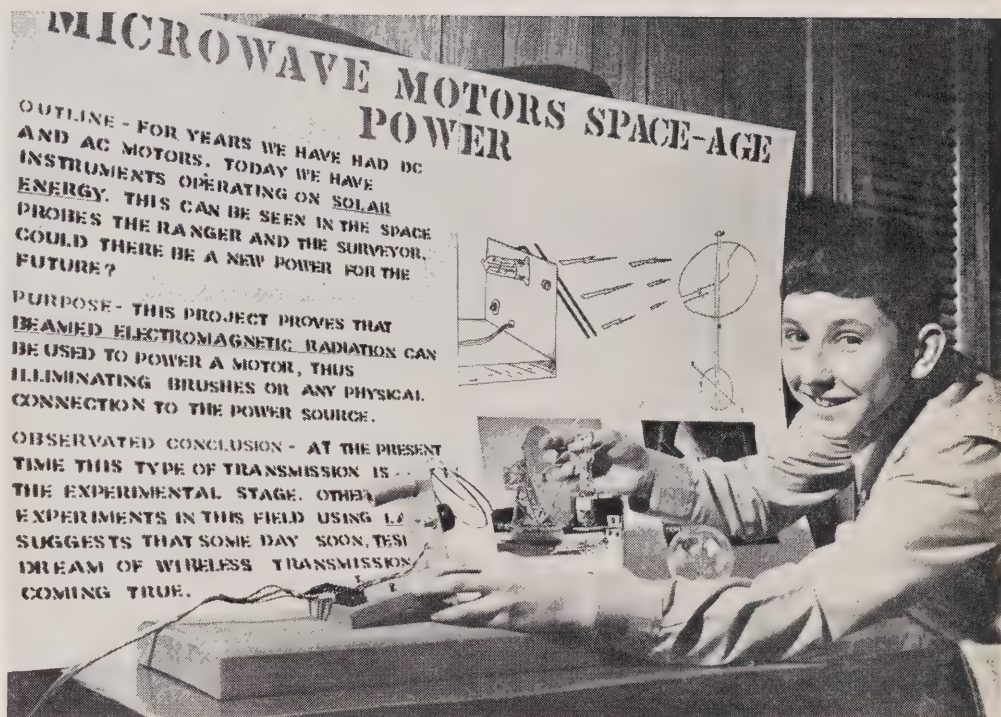
What are they really like, these young and promising scientists of tomorrow? A teacher describes his inventor-student as a keen competitor, with great persistence. "It bothers him when he can't get the answer to a problem".

Their biggest complaint is how science is taught in the schools. They are critical of science relegated to blackboard techniques, when it could be presented creatively, more excitingly."

As a group, they tend to exhibit similar characteristics — the ability to abstract and analyze. They are inventive and they are logical. And they are also sure of their competence in a matter-of-fact way that is refreshing.

Some of the students went on to the finals at the national fair held this year in Regina. Others attended the international fair at Fort Worth, Texas. For all the winners, and their parents, it is a time of excitement and keen concentration as they work to perfect their inventions and get them into shape for the big event. Because they are articulate about their work, their world and themselves, we decided to let four of them tell their own story.

# I told him to use a fail-safe device...



*Ted Sokolowski: Age: 15*

*School: Scollard Hall, North Bay. Project: beamed electromagnetic radiation.*

## Ted Sokolowski

I decided to work on the transmission of electric energy by microwave radiation after reading an article in a monthly magazine. The radio frequency radiation was generated by an oscillator, picked up by a wire loop and converted into DC current by a diode. The power was then used to operate a small electric motor.

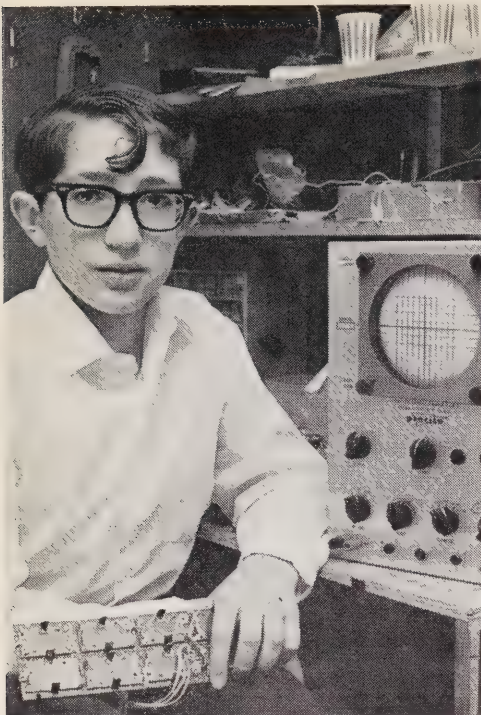
My equipment was effective over a distance of about three inches, although the article mentioned keeping a model helicopter hovering 50 feet in the air. Altogether, I worked about four weeks and spent \$15 on the project. Some of the parts, such as the magnet and coils, I already had. I borrowed a grid dip meter

from Bell Telephone to get the motor to resonate at the same frequency as the oscillator.

If the large-scale transmission of electric energy becomes practical it will have fantastic possibilities. It will dispense with the need for Hydro lines and would make it possible, for example, to power a space vehicle from the ground.

I'm in grade 10 at the moment, but I hope to go on to university and study aeronautical engineering. As far back as I can remember, I've always been interested in technical subjects. Science classes at school are all right — you just have to know the work. But I think schools should have better equipment at their disposal.





**George Edward Callway: Age: 14**  
**School: Hillfield College, Hamilton.**  
**Project: an electronic computer. George was the youngest contestant at the Hamilton fair.**

## George Edward Callway

I got the idea from a toy plastic computer. My electronic computer adds, subtracts, multiplies, plays NIM — that's a number game that computers find relatively easy to play. It can count numbers and compare different numbers. It can also do boolean algebra.

The only difference between the electronic version and the toy mechanical computer is that I used electronic parts like transistors and integrated circuits. I didn't copy any particular design. I just built it myself.

Finding parts is pretty expensive. I had some parts left over from last year's project for the fair. Last year I did a computer specifically designed to play NIM. It could play up to the number 15. And I won a trip to Vancouver with that design.

Some of my parts I got from a mail order company in Winnipeg, because they advertised a special bargain of surplus transistors — six for \$1. If I bought them downtown they would have cost me \$2 each. But I found Army-Air Force surplus equipment in some of the Hamilton stores, so I got some equipment there, too.

Science classes in school are pretty interesting. Although I seem to know more than the other kids, because of the reading I do on my own in science, I

learn quite a bit from our experiments in class.

Over the past years, I've been collecting equipment — sort of building up a basic collection. I don't do any experimenting or projects in chemistry. I just stick to my own field of electronics, and so I'm acquiring a collection of tools.

I guess I first got started on science with my Meccano set, and from there I was always taking clocks and flashlights apart to see what was inside, and how they worked. My plans for the future? Oh boy. Well, I guess I'll go to university and take a science course. My sister is in third-year science at university now.

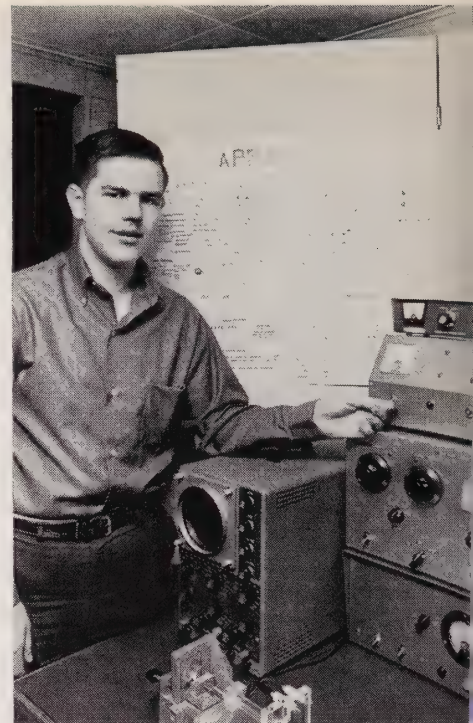
## George Stasiuk

My original project for the science fair was a gas laser. However, some difficulties arose when I was unable to replace a scratched Brewster window. I then decided to do a study of gas plasmas since the experiments require the same general equipment. The study has important applications in the field of lasers.

One of my main areas of interest was to devise an efficient method of coupling radio-frequency power into the plasma. I designed a unit consisting of a balun coil and an impedance matching network to couple RF power by means of external electrodes. This eliminated construction difficulties inherent with internal electrodes. Further work with the project consisted of filling the glow-discharge chamber with different gases and measuring the light output of the discharge at different power inputs.

Although most of my reference sources were books on the topic, my participation in previous science fairs has helped immensely. Through the judges, who were mostly University of Toronto professors, I have gained many ideas for further experimentation. Also, through the university laboratories I was able to get some used glass equipment which otherwise would be very difficult to obtain. In addition, I gained some valuable information from Walter Berndt, a grade 13 student at our school, who built a laser last year.

As for recreation, most of my interests are connected in some way with science. I have a licence to operate an amateur radio station and have constructed most of the equipment myself. Conservation and the outdoors are also interests of mine and I have participated in the Ontario Forestry Association youth programs. I have also a part-time job as a lab assistant at school, for which I am paid.



**George Stasiuk: Age: 17**  
**School: Silverthorn Collegiate, Etobicoke.**  
**Project: experiment involving gas plasmas. George is a two-time winner at the Toronto fair.**

As for science in schools, I feel that there are several students in each class who do studies in more depth. The present system does not allow them to explore their ideas. After high school, I hope to study engineering science at university.

## Richard Keefer

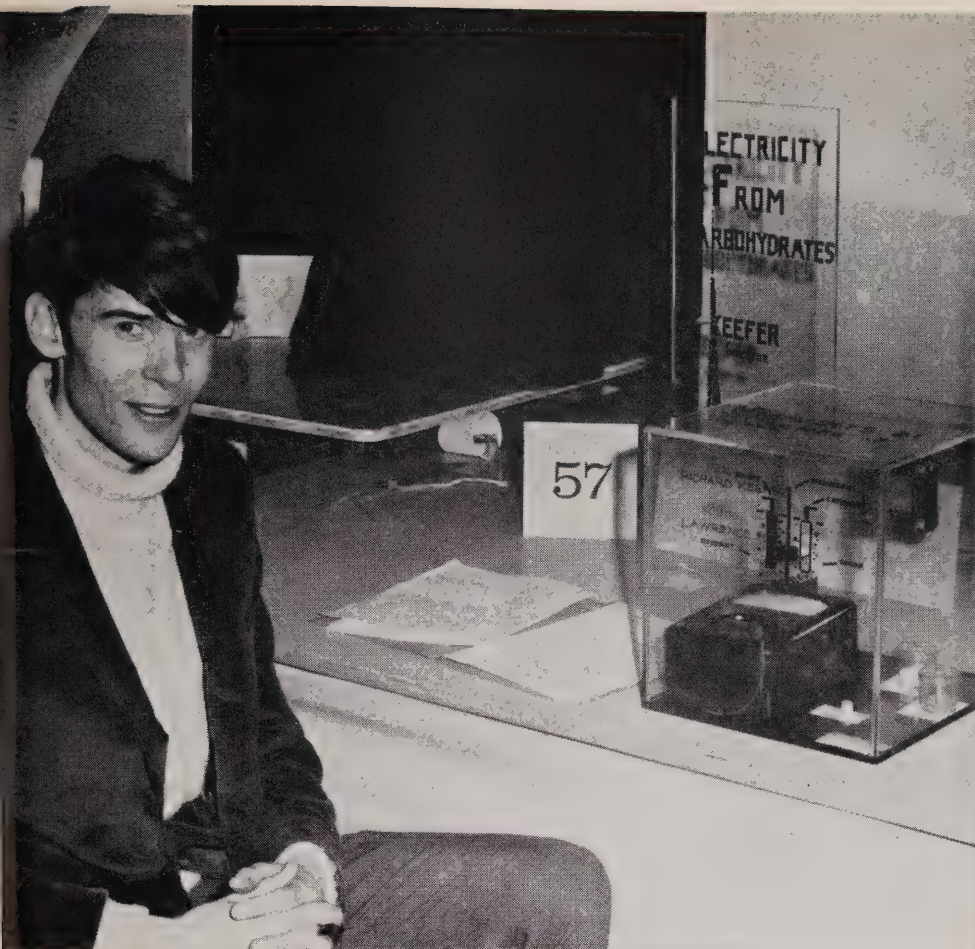
My idea for using carbohydrates in fuel cells got started when I was toying with the idea of duplicating a parallel between biological functions and how the body disposes of carbohydrates as energy, and the energy process in fuel cells. First I used sugar, and then starches and even cellulose.

But to start at the beginning: all batteries are made up of two parts. A reductant yields electrons which pass through an external circuit giving up energy. And an oxidant takes up these electrons, also yielding an output of energy. You can have a metal for this function of giving up electrons — or a variety of things.

What I have endeavored to do is substitute carbohydrates for the reductant. In the type of medium that a cell provides, carbohydrates are really ideal for this because they have a very high energy content and are quite reactive. They're pretty cheap compared with some metals.

It was pretty difficult to get any information about this type of experiment. A great





**Richard Keefer: Age: 17**  
**School: Lawrence Park Collegiate, Toronto. Project: fuel cell burning carbohydrates.**  
*Richard has secured a provisional patent for his device. Several manufacturers have expressed interest.*

al of information is available on fuel  
 ills, but most of them use oxygen. And  
 ese are very inefficient because you  
 ve to carry around a huge tube and  
 nks of gas.

managed in my invention to take  
 vantage of the oxygen in the air, and  
 o to boost the air oxidation potential.  
 r a catalyst I used ferric nitrate. I tried  
 her chemicals, but found this one best  
 cause it is a combination of catalytic and  
 idative properties. When I purchase  
 y chemicals, I find the average corner  
 ug store proprietor is pretty suspicious  
 out teenagers buying chemicals, so I  
 ve to make up pretty good alibis.

Equipment is a bit of a problem, too.  
 Sometimes the cost is prohibitive. But the  
 University of Toronto has been pretty  
 ngerous. They loaned me a voltmeter.

er I had done preliminary work on my  
 invention, I had a legal firm which does  
 ent work conduct a "novelty search" to  
 e whether it was unique. Finally, a  
 nth before the fair, my British pro-  
 onal patent came through. And now  
 eral Ontario firms are actually interested  
 t.

Most of my time is divided between  
 homework and my scientific investigations.  
 I love skiing and reading poetry and  
 plays – especially the plays of George  
 Bernard Shaw and Arthur Miller. But  
 most of the time I read scientific books. I  
 have a few more inventions in mind that I'd  
 like to try when I get time.

I can't share my scientific interest with  
 too many friends. You have to be careful  
 with friends, who might become bored if  
 you start explaining a lot of details about  
 your investigations.

Chemistry is a subject not too many people  
 are interested in, and even those who  
 are seem to be more concerned with  
 figures and calculations. I like the creative  
 and inventive side. That's one of the  
 reasons why school science classes  
 present a problem. Before the present  
 term-mark system, I was better off because  
 they made allowances for me and I could  
 work at my own level. But now I have  
 to put time in the classes and write tests  
 to get my marks, and it's pretty frustrating.

I don't think my success in science is  
 unusual. It's largely a matter of interest.  
 Some people love music or art this way.

## And three proud dads

Fathers of three students at this year's  
 Toronto fair work for Ontario Hydro.  
 E. P. Stasiuk, father of top winner George  
 Stasiuk, is an electrical technician at  
 the Dobson Research Laboratory in  
 Etobicoke so George naturally received a  
 great deal of encouragement at home.

Martin Green, who is 16 and in grade 12  
 at the University of Toronto Schools, is a  
 winner in the past two science fairs.  
 This year he entered the fair at the last  
 minute because school work was pressing.  
 His project was on color pigments. Martin's  
 father is W. F. Green, a supervising  
 engineer in charge of electrical testing  
 at the Dobson Laboratory.

Stephen Dukoff, whose father, D. S.  
 Dukoff, is line maintenance training  
 co-ordinator for all Ontario Hydro linemen,  
 entered the fair for the first time this  
 year and won two prizes. His experiment  
 concerned the catalytic hydrogenation  
 of unsaturated fats.

Mr. Dukoff says Stephen is a real chemistry  
 bug who has all but taken over the  
 family's basement. "Stephen spends  
 every cent he has on chemical equipment  
 and supplies. His next expenditure is  
 an apron – to save his trousers from  
 acid burns.

"Stephen doesn't wear out his trousers  
 like most boys his age – he wears them out  
 through chemical experiments!" says  
 his dad. □



# it's electrifying!

by Sheila Kenyon





out of the hairy half-world of hippies, beatniks and folksingers has come a new experience.

It is a strange — some would say meaningless — mixture of sound and light. It moves without apparent story. Its music is often without melody. But it has a strong hypnotic impact — like voodoo drums deep in the jungle.

Some psychologists believe that the white noise, swirling colors and flashing strobes of this new medium of the electronic age create externally for the individual the sensations produced internally by mind-expanding drugs.

Certainly, the discotheque with its sensory bombardment can produce an altered state of awareness with accompanying emotional involvement," says Dr. Malcolm Andrew, staff psychiatrist at the Addiction Research Foundation.

Latest to join the ranks of those offering total experience entertainment is Toronto's Electric Circus, which opened earlier this year. Its originators describe it as an experimental environment."

Conceived and conceived by Toronto-born Stanton J. Freeman and Jerry Brandt, the Electric Circus has only one precedent — the Electric Circus in New York. The Electric Circus is designed as a multi-media theatre to provide an almost infinite variety of experience and involvement.

The big spectacular is the Light Show, which has borrowed the multi-screen approach used so successfully in movie production. But instead of producing an integrated documentary, it offers an optic texture — a pure visual experience.

From a production booth, slide projectors, 35 mm projectors, "black" lights and strobes are controlled by a digital computer which automatically varies the intensity of the lights and projectors in relation to the rhythm and volume of sound. The full screen on which the visuals are shown is 10,000 feet square and the sound is equally ambitious, reverberating through the room and, incidentally, the eardrums.

In addition to the entertainment, the Electric Circus offers top name groups, circus acts and mimes. The building itself consists of two derelict structures joined together and modernized to include gentle ramps, low ceilinged tunnels, broad light areas, space to dance in, space to squeeze into, a place to dream, corners to explore, glimpse-through slits, odd places, privacy, luxury, fun. It is an entertainment centre where the young of all ages can get "tuned-in."

The first Electric Circus opened in New York in 1967, and about 400,000 persons



*Electric Circus show is controlled from production booth, above. Below, for patrons, the atmosphere is strictly informal.*



have paid to visit it. The Toronto Circus charges adults \$4 admission. You can relax, get involved, drink pop or eat hot dogs.

Gloria Collinson, of the Electric Circus designers Davies Collinson, says teenage customers really do become involved. "We were worried at first because all they did was stand around and stare. Now they're less inhibited. One girl even turned up in a bikini the other night. Everyone thought she was part of the act."

Older people have been forced to leave such entertainments. In March, 1968, the climax of a light-sound show, Duplex Presentation 3/6/68, performed by Intersystems, an association of four young artists, for 200 people at the Toronto Art Gallery was described by a newspaper reviewer: "The total effect is somewhere between Queen Victoria's birthday and the bombing of Dresden. Some jazzy tunes are introduced, and it's all transformed into Broadway boogie-woogie."

That was when some of the adults left.

Yet another but more subdued type of electrosonic art called polyvision was used in the Czechoslovakian pavilion at Expo. Films and slides were projected on walls, ceilings, box-like screens and revolving objects. A variety of special lighting and sound effects was employed.

Developed by Czech designers and engineers, polyvision used two recording units and complementary relay systems. The show was completely pre-recorded and pre-synchronized.

Other sophisticated art forms combining sound and light include the Son et Lumiere spectacles that have been produced everywhere from Ottawa's Parliament buildings to the pyramids along the Nile.

Son et Lumiere productions employ dialogue, narration, music and lights of many colors. They are intended as night-time tourist attractions to present a story in the location where it actually happened.

The cost of staging such a spectacle is high. A show outside Canada's Parliament buildings throughout the summer of 1967 employed shifting lights and stereo-phonetic sound to reproduce such events as confederation, the first world war and the great fire which destroyed Parliament's central block in 1916. It cost about \$200,000.



*Customers at the Electric Circus do their thing.*

*Below:  
Son et Lumiere presentation that will dramatize the history of the Bahama Islands is shown under production.*



One of the latest Son et Lumiere presentations is "Silent Guns", produced on behalf of the Bahamas Ministry of Tourism. "Silent Guns" takes place at Fort Charlotte, a bastion built in 1787 to guard the western waterway to Nassau harbor. Although no great historic action took place there, the production makes uses of the guns, battlements, guard house and drawbridge in a colorful spectacular of piracy and military operations in the Bahamas in the 18th century.

In yet another art form, artists are borrowing from the world of electronics to make what one Montreal artist calls "luminous frescoes". Jean-Paul Mousseau has been receiving multi-thousand dollar commissions since 1961 for his creations. Quebec Hydro, for instance, paid \$22,300 for a 71-foot mural that weighs a ton and a half and presents an endlessly changing arrangement of light and color. It is ruled by 4,200 feet of neon tubing, 70 electric circuits and an electronic brain. It won't repeat a pattern for 200 years. Another Mousseau creation, at the Chez Son Pere

restaurant in Montreal, allows diners to turn knobs to make their own picture forms.

Where is all this leading? Will the trend toward electronic art forms and entertainment accelerate, or is it merely a passing fad?

One educator pointed out recently that the modern child is unlike the children of the radio age. In the days of radio, young people used their own imagination to fill in the visual experience. Today, with television and a plethora of audio-visual aids, they expect to be entertained and amused with their eyes as well as their ears. More and more they will expect sophisticated visual entertainment. □



# the biggest thing to hit Bruce

## ...or what happens when Hydro comes to town

When news of Ontario Hydro's impending construction of a 200,000-kilowatt nuclear generating station at Douglas Point in Bruce County was first made public in 1959, W. A. Davey, then mayor of nearby Port Elgin, described the project as "one of the biggest things that has happened to Bruce in this century. It will really put this area on the map."

Years later, with the construction of the world's second largest nuclear station and a major heavy water plant scheduled to start there this year, those words are being re-echoed.

George Grant, of Paisley, which is about a dozen miles from the nuclear site, says: "It's the greatest thing to ever hit this area. We can, we must, move with it and keep ahead of these vast power requirements."

The decision to build the 3,000,000-kilowatt Bruce generating station is a key step in Hydro's nuclear program, launched in 1956 with the start of construction of the Nuclear Power Demonstration plant at Rolphton, on

the Ottawa River. This was followed by the Douglas Point station, completed in 1967, and the undertaking of the 2,000,000-kilowatt Pickering plant, east of Toronto, which is due to deliver initial power in 1971.

Now, this tremendous expansion at Douglas Point means that millions of dollars in wages — the nuclear station and heavy water plant will carry a combined price tag of \$875 million — will be poured into Bruce and the neighboring counties of Grey and Huron. But not without a few mild headaches.

Take Kincardine, a town of 2,800 on the shores of Lake Huron just south of the nuclear complex.

"There haven't been six houses built here on speculation since I came back from the war in 1945," says Charles R. Merritt, town clerk-treasurer. "Now we've got a 200-unit town house and apartment complex before council. It's to be built on nine acres of town land by a Toronto developer and it's possible it could be increased to 273 units."

This project alone could accommodate enough children for a 10-room school. And at a ball-park estimate of \$40,000 a room, that's a heavy investment for a small town. Other services such as water, sewers and roads are less of a problem, says Mr. Merritt. In fact, they were recently upgraded.

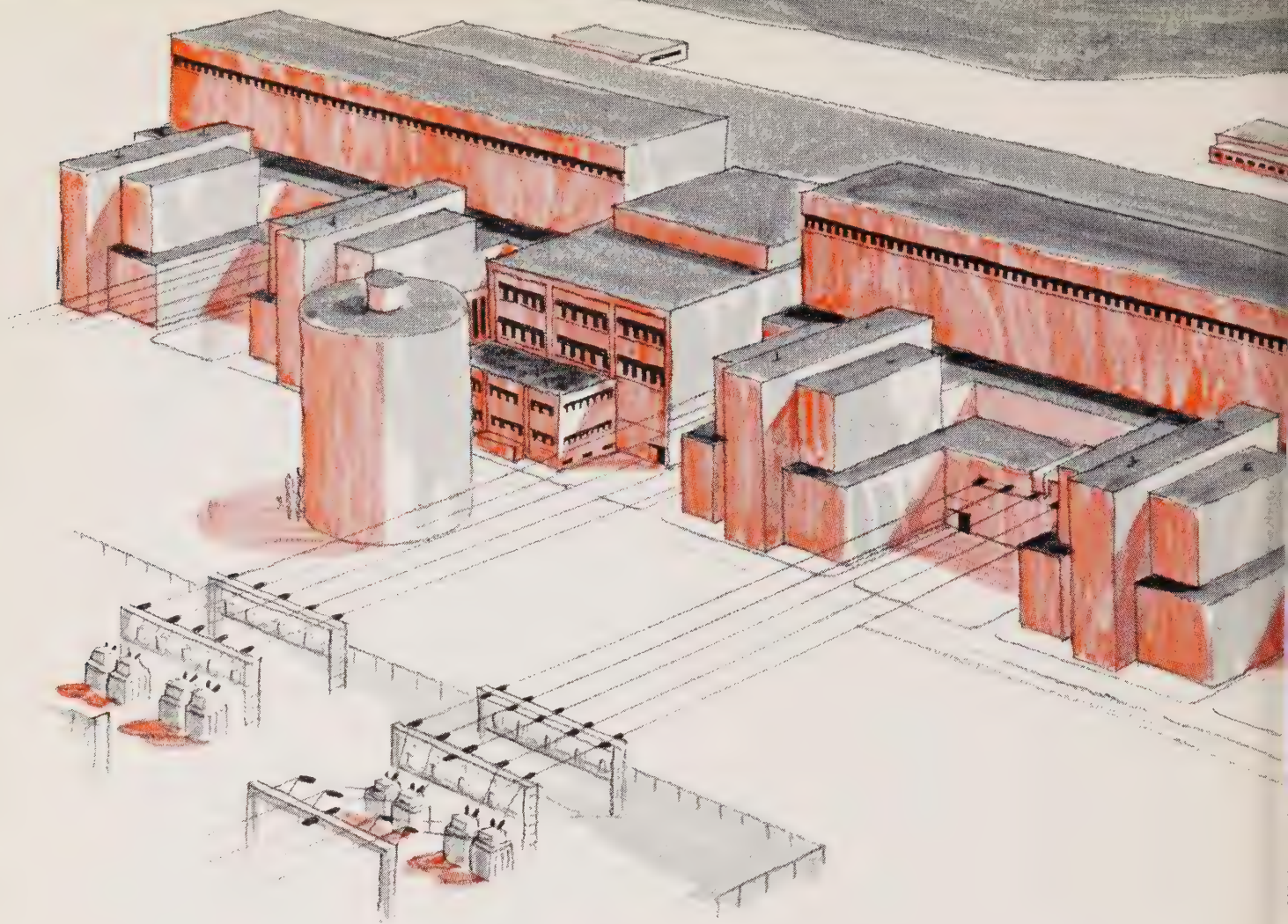
On the town's northern boundary, in the township of Kincardine, another single-family development of more than 200 units is proposed. Since the town of Kincardine provides water and sewage services for its neighbor, the new development there will have an effect.

And in Port Elgin, about an equal distance north of the project, the story is the same.

Mayor Bud Wilson says a major Ontario builder is negotiating with Port Elgin for town-owned land on which to build a rumored 150 homes.

"Land prices have skyrocketed," says Mr. Wilson, and that cry is being echoed in communities around the Bruce station. Building lots that sold a year ago for as little as \$1,200 now sport a price tag of





\$5,000. Older home prices and rents are also experiencing the same upward trend. Neither of the two communities is entering the boom blindfolded. Kincardine has retained a lawyer well versed in the intricacies of land development to help council over rough spots. Port Elgin is dealing with well known, well investigated developers.

Mr. Wilson points out that at the time of the construction announcement in December, Port Elgin was approached by "fly-by-night" developers who lacked the necessary financial backing.

In addition to the economies of power production, Ontario Hydro is concerned with the social and economic impact on a region where the influx of workers and their dependents alone could exceed the combined populations of the communities nearest the huge installation. Hydro has plans for a camp to accommodate 1,500 men at the site, but an estimate that a minimum of 1,000 dwellings will be required for workers with families wishing to locate in the surrounding area poses a major housing problem.

Municipal officials aren't the only ones to welcome the expected economic boom.

Businessmen and just plain citizens are enthusiastic. In the restaurants over cups of coffee and in the street, there's an atmosphere of excitement and talk of growth. In the Bruce Inn on Kincardine's main street there's talk of a motel going up "just around the corner, behind the bank."

The Inn's proprietor, Mac McKenzie, explains that the motel was to be the owner's retirement project. It would be open during the summer months when the town's population triples with tourists, then closed for the rest of the year while the owner went to Florida.

"I tell him it would now be worth his while keeping it open year-round and hire someone to run it while he's enjoying his winter vacation," says Mr. McKenzie.

Jack Schepper, manager of the Bank of Montreal in Kincardine and president of the town's Chamber of Commerce, says one of the main problems of merchants is parking. Since the main thoroughfare is also Highway 21, there is limited on-street parking, and that's metered.

"I'm sure we can solve this with nearby off-street parking," says Mr. Schepper.

"We've got a young Chamber and the members are looking forward to the new business Douglas Point will bring. All along the street, people are dressing-up — repainting and redecorating their stores both inside and out to draw in business."

Mr. Schepper says that as far as the banks are concerned — the Montreal, the Royal and the Commerce serve the county — customers can expect the same service they would get on Bay Street. "There's no such thing anymore as a rural bank."

The banks are taking a close look at Tiverton, a village of 400 just a stone's throw from the Bruce complex, as a possible site for a branch. Even on-site banking is a possibility.

Almost all local officials and residents, while welcoming the nuclear project, express worry about what is termed the "short fall" tax situation that an influx of residents without an increase in industry could create. In both Kincardine and Port Elgin, tax ratios already fall short of the ideal percentage of 40 per cent industrial, commercial and 60 per cent residential. The towns have the assurance that Hydro and Atomic Energy of Canada (builder

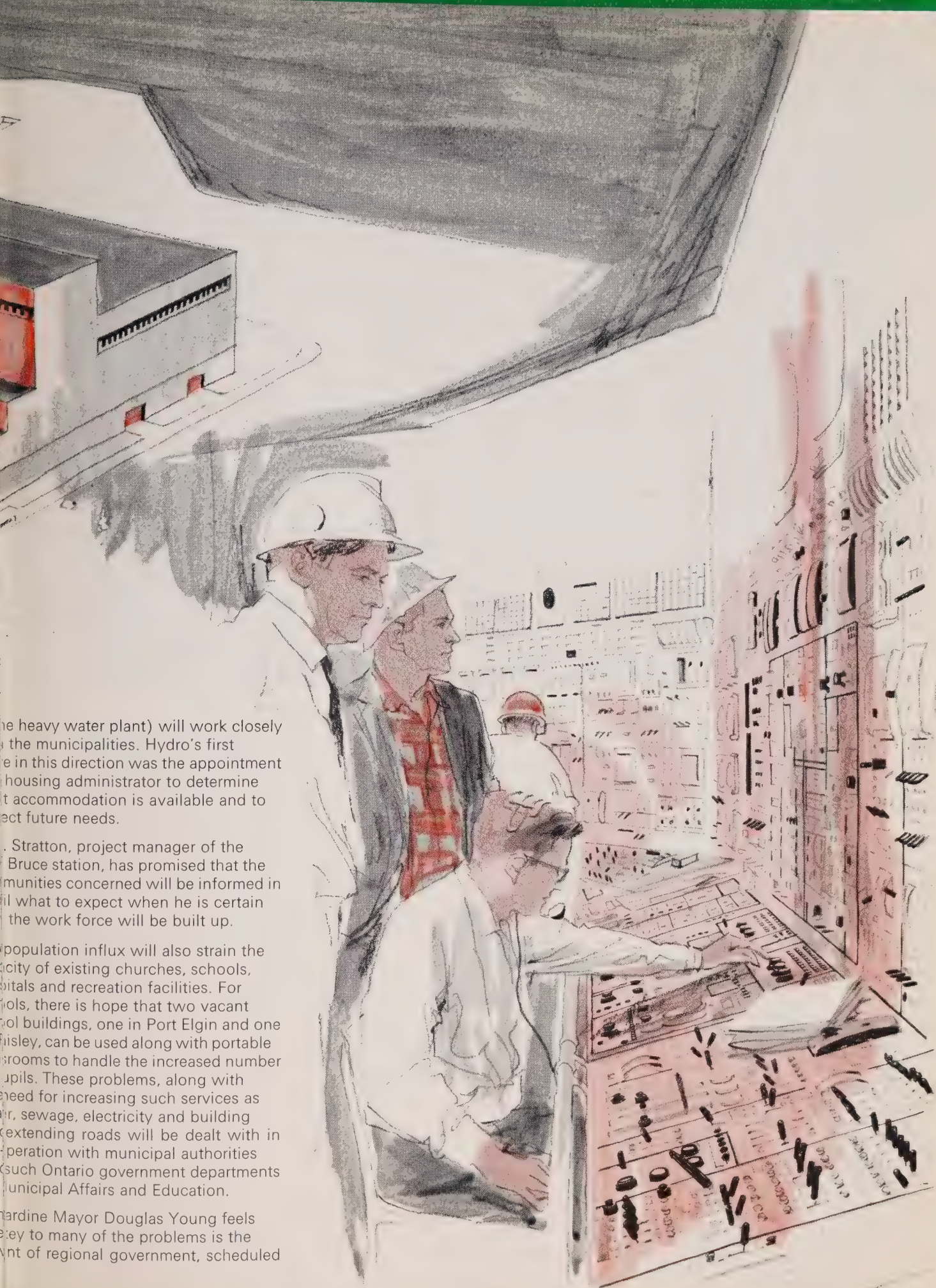


the heavy water plant) will work closely with the municipalities. Hydro's first step in this direction was the appointment of a housing administrator to determine what accommodation is available and to project future needs.

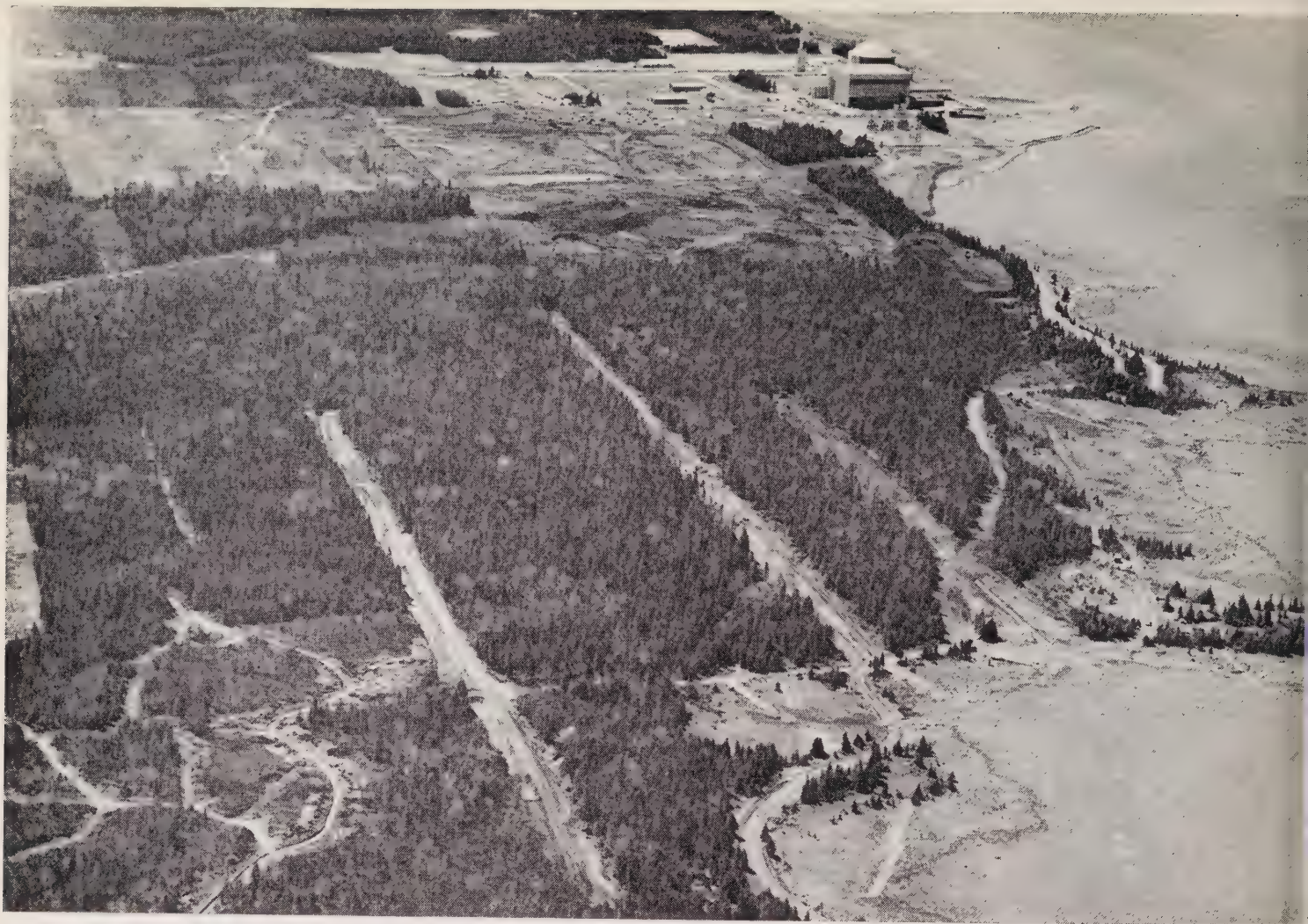
Stratton, project manager of the Bruce station, has promised that the municipalities concerned will be informed in time what to expect when he is certain that the work force will be built up.

population influx will also strain the capacity of existing churches, schools, hospitals and recreation facilities. For schools, there is hope that two vacant school buildings, one in Port Elgin and one in Wisley, can be used along with portable classrooms to handle the increased number of pupils. These problems, along with the need for increasing such services as water, sewerage, electricity and building extending roads will be dealt with in cooperation with municipal authorities and such Ontario government departments as Municipal Affairs and Education.

Mayor Douglas Young feels that one of the key problems is the lack of regional government, scheduled







to come into being in a few years. At present, Hydro pays grants in lieu of taxes to the municipality in which its stations are located. At present the township of Bruce receives the grants, "but Bruce puts absolutely nothing into it," he says. "No roads, no housing, no services."

If a regional government is formed, the grant would likely be paid to a much larger municipal entity, including many of the communities in which Hydro workers will live. Mr. Young suggests that local officials should do everything to hasten the establishment of regional government.

Starts in this direction have been made with the creation of a County Board of Education replacing the multiplicity of local boards. This gives education officials a wide base from which to deal with the influx of workers and families.

The build-up of Hydro construction forces will reach its peak in 1974-75 when about 3,400 men are expected on the project. Since service industries invariably follow the payroll, many such enterprises, along with other businesses, will doubtless be established between now and then. That will mean still more population and accompanying community development.

Professor E. G. Pleva, of the University of Western Ontario, submitted a forecast of services to Bruce County officials a few months ago to show them what the population growth can mean.

For each 100 workers there will be 472 more people and 149 more cars. There will be an estimated 118 students for each 110 workers, 69 in elementary schools, 40 in secondary schools and nine in university. Based on the 100-worker figure, public lands required will total 6.7 acres made up of 1.6 acres for elementary schools, 1.1 for high schools, 1.9 for parks and 2.1 for playgrounds. Costs of additional policemen will be \$6,721, the extra firemen \$4,372 and the additional municipal staff \$16,405. And for each 100 workers the additional municipal services would include 2.08 hospital beds, 704 library books and .21 more cells in the county jail.

A Port Elgin merchant suggests that accommodation built for senior citizens could help alleviate the housing shortage.

"Port Elgin has been known as a retirement town, and it's quite true. I know of six houses in one area where four are occupied

by either widows or older couples. If these people moved into modern senior citizen facilities, the homes could be utilized for families."

He says the older citizens don't realize how "great" modern apartments can be and how they would free them from out maintenance like snow-shovelling and grass-cutting.

Preliminary work on the new nuclear or heavy water plants is now well underway with clearing and drilling in progress. Experience gained from other stations in the nuclear program will be incorporated in the new Bruce station in the form of design and construction refinements and improved operational techniques. The Douglas Point station has come under fire from time to time by critics of the Canadian-developed natural uranium-heavy water concept. But most of the b have now been ironed out and, with Pickering due to produce first power in two years and considering the \$793 million commitment to the Bruce plant, further evidence of confidence in the natural uranium-heavy water concept is hardly needed.

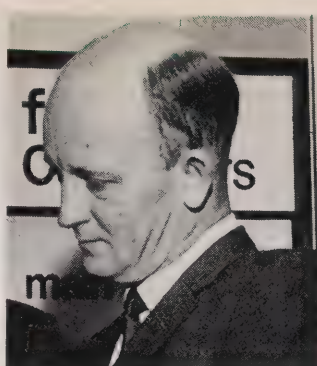




Frank Schepper



Charles Merritt



Mayor Bud Wilson

*Giant Bruce nuclear plant will be located in foreground of the left photo with the heavy water plant between it and the existing Douglas Point station at the top. Drilling and site clearing are underway, below.*



decision of AECL — consultant and sometimes partner in Hydro's nuclear program — to construct an 800-ton capacity plant at the Douglas Point site to provide heavy water for the AECL-designed CANDU reactors at the Bruce station, as well as for similar reactors in other generating stations, is a further vote of confidence. AECL also has its eye on the foreign market, where CANDU reactors are winning recognition as the best thermal power reactors available in terms of fuel consumption and consequent long-term low-cost fuelling.

One of the obstacles to overseas marketing of CANDU plants has been the insistence of prospective customers on a guaranteed supply of heavy water for at least the initial installation. It was this, along with Ontario Hydro's rapidly growing commitments in nuclear generation, that prompted AECL to increase the capacity of the plant from 400 to 800 tons of heavy water a year. The \$115 million project is expected to be completed in 1972, four years before the first unit of the Bruce generating station comes on line.

Time for operation of the AECL plant in the interval between its completion and

the beginning of service by Bruce GS will be drawn from the existing Douglas Point reactor. This will mean an interim reduction in the output of the 200,000-kilowatt plant. But that temporary sacrifice of output could turn out to be a good investment.

A Canadian-type nuclear power station, using heavy water for moderator and coolant, requires about a ton of heavy water for every 1,000 kilowatts of capacity. On the surface, the 800-ton annual capacity for which the AECL's Bruce plant is designed would appear to be but a drop in a rapidly-expanding nuclear bucket. The fact that once a reactor is fully charged, only a few pounds are needed annually to replace that lost through leakage is what makes the difference. Canada is now dependent on the United States for heavy water, at a rate of about \$28 a pound. An estimate that the AECL plant could produce it for \$20 a pound represents a prospective saving of \$48 million at the Bruce GS alone, where heavy water requirements will be 3,000 tons.

Use of what is sometimes referred to as "waste steam" will be among the unique and cost-saving features of the Bruce

nuclear complex.

When the new generating station goes into production, low-pressure steam channeled from the station to the heavy water plant will take over the function performed by the high-pressure steam diverted from the original Douglas Point reactor for operation of the plant. The end result will be a double credit — return to normal output by Douglas Point, and utilization of energy that otherwise would be lost.

Community leaders are already looking beyond 1979, when a permanent combined staff of 600 to 700 is producing precious heavy water and directing a power flow almost 50 per cent greater than the total output of Hydro's plants on the Niagara. They are looking beyond that date and hoping that housing made available by the withdrawal of construction forces and the proximity of one of the world's great nuclear power complexes will attract industry to the area and maintain the economic forces set in motion by Ontario's insatiable thirst for electric power.

Most think it will. As Mayor Bud Wilson says: "One major industry could be worth 10 nuclear stations to the town." □



# a dream of a home

For those who would build a dream home, Alan and Dorothy Cliffe have some sound advice: don't dream, plan. In fact, they gave their dream home several years of careful thought.

"We collected magazines for five years and clipped everything we liked, even if it was only a clothes closet," says Mr. Cliffe, who is president of Hartz Mountain Pet Supplies and on the board of several associated companies. "We didn't engage an architect, but the contractor told us he had never built a home with so many unique features."

The house the Cliffes built stands on six acres of ravine lot on Margaret Street, St. Thomas. A century-old brick home was torn down on the site to make way for the one-storey, rambling French provincial residence with its mansard roof.

Certainly, it's no ordinary home. Where, for instance, will you find a crystal chandelier glittering above a sunken bath?

Then there's the circular living room with its Louis XVI marble fireplace and the white-columned vestibule with its sculptured garden figures including a fountain depicting a boy on a dolphin. And where will you find a recreation room patterned so realistically after a sunken ship that the fittings, even down to the portholes, are genuine?

After these you can almost take the outdoor pool, the sauna to seat six and the gymnasium still under construction for granted. The deep blue circular rug in the living room was specially woven in Hong Kong so that no seam would mar the 26-foot diameter. "We tried several companies who wanted anything up to eight months' delivery time," says Mr. Cliffe. "Finally, we tried someone in Hong Kong. They had it on a ship within five weeks."

From an electrical point of view, the home is equally fascinating. Every room except the guest wing is hooked into an intercom system that includes a front





# based on hard fact)

rear door answering service. Music from hi-fi equipment hidden in the family room wall is piped throughout the house to the patio and pool. Local calling is available from telephones in each room; special phones enable Mr. Cliffe to talk directly to his sales force in Toronto and Montreal.

A built-in vacuum system — four times as powerful as a conventional vacuum cleaner — services all areas of the house and pipes dust and dirt directly to a container in the garage. The garage doors open automatically, controlled remotely from the family's two cars.

Multiple light switches, many of them equipped with dimmers, control up to dozens of lights in the main rooms and controls at the front and rear doors allow

every light in the house to be extinguished from the one location. Spot lights recessed in the ceiling highlight paintings and other works of art.

The house is warmed mainly by electric heating cable hidden in floors and ceilings and is cooled by three separate air-conditioning systems. The kitchen is a housewife's dream with garbage disposal, electric barbecue and grill and an oven top that looks like part of the counter (the elements are buried in opaque, heat-resistant glass). Instant boiling water — enough to make two or three cups of tea or coffee — is dispensed from a special unit near the sink.

Of course, all this, the underwater lighting for the pool, the electric sauna and many more features mean that the house consumes a great deal of electric power. In fact, the peak load is about 60 kilowatts, which is six times as high as a normal-size all-electric home and tops even the load at Mr. Cliffe's pet food plant, a few miles away.

Always one for innovations, Mr. Cliffe is now thinking of obtaining a one-way mirror to place in front of the bedroom TV. "The television will normally be hidden, but when switched on will be visible through the mirror," he says.

Unusual, yes. But this is no ordinary home.



*Alan Cliffe and his wife, Dorothy, relax in the family room of their new home. Also shown are the recreation room, circular living room, kitchen and master bathroom.*



# warming up to infrared

by Hal O'Neil



*Infrared camera is set up to record water temperature.*

Sniffing out a CAT sounds more like a canine hang up than anything connected with the jet age.

There is, however, a specially equipped T-33 jet trainer streaking across the North American skies in search of the elusive CAT — ferocious as any feline, but much more disastrous in effect.

In this case CAT stands for Clear Air Turbulence, a phenomenon that baffles scientists and is the suspected cause of several mysterious plane crashes in clear sunny weather. CAT strikes without apparent warning, and airborne radar cannot detect it.

The T-33 is doing the sniffing for the Ottawa-based National Research Council. And at the heart of the aircraft's delicate detection equipment is a device sensitive to infrared radiation. Infrared, or IR, is essentially a radiant energy which appears just below visible light in the electromagnetic spectrum and is stretching man's senses to almost unbelievable limits.

What makes infrared so useful is the fact that every object on earth — the human body, trees, metal, rocks — continuously gives off electromagnetic radiation in proportion to its temperature because of the oscillation of its atoms and molecules. If the temperature is high enough, part of the radiation becomes visible as light.

At lower temperatures, the bulk of the radiation falls into the infrared range.

Though invisible to the eye, these radiations may be detected and measured. Just as the eye distinguishes mauves from blues, IR detectors can note subtle temperature changes.

In the case of the CAT detector, an infrared spectrometer samples the temperature of carbon dioxide in the air up to 60 miles ahead of the aircraft. Since the temperature of the turbulent air is believed to be drastically different from the surrounding atmosphere, any change in the temperature readings furnishes a warning to the pilot. He can then take evasive action if necessary.

A product or rather a problem of the jet age, CAT occurs at heights where propeller-driven aircraft normally didn't venture. The turbulence hits with such force that it can cause structural damage or plummet the plane thousands of feet within seconds.

Infrared instrumentation has played an important role in man's probing of space. In addition to taking the temperature of Mars and Venus, infrared devices have been turned on the earth from orbiting satellites. The Tiros program of 10 years ago employed two radiometers, one wide and one narrow field. They collected

and returned to the ground enormous amounts of data concerning the temperature of the earth and its atmosphere.

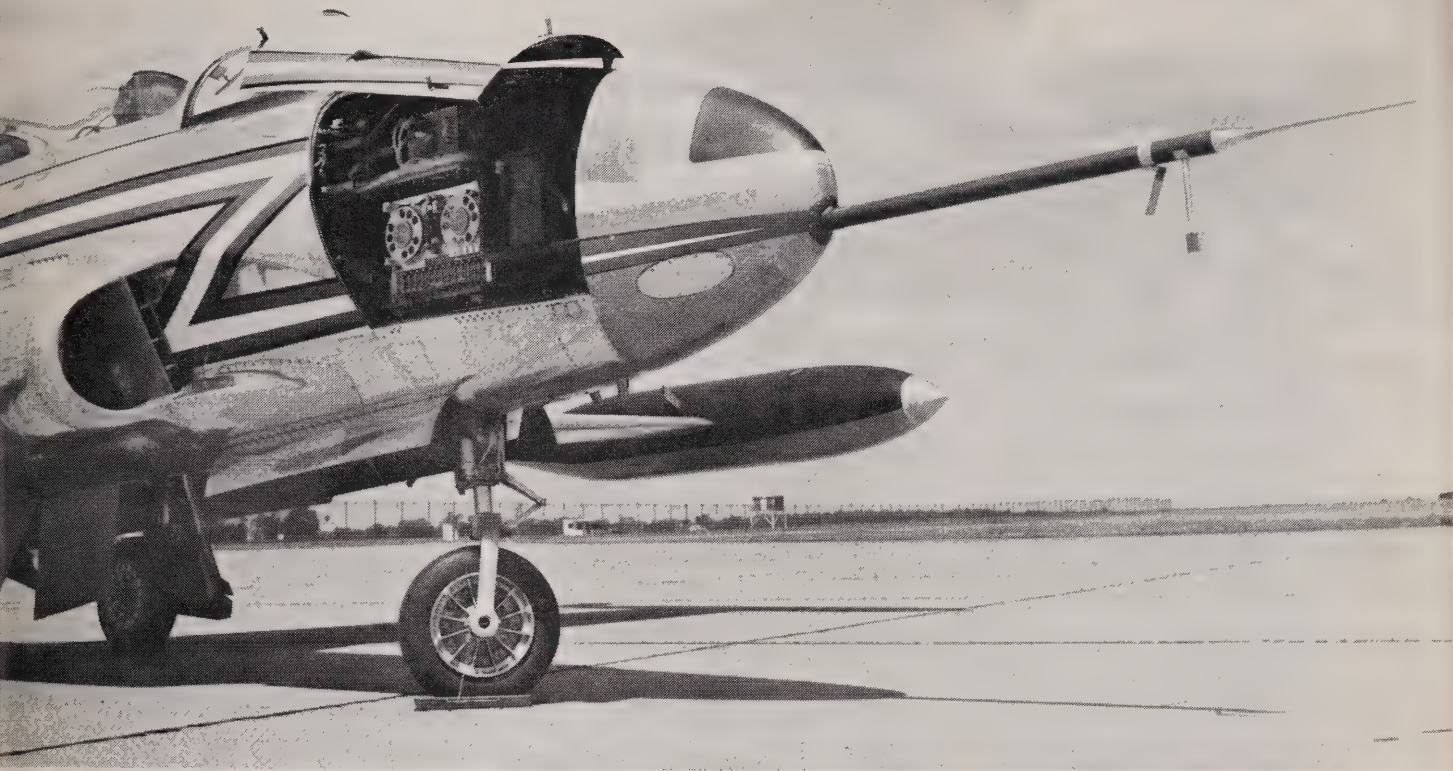
Like many of man's technological advances, infrared devices emerged early as tools of war. One of these was a sniperscope scanning device used during World War II. An infrared beam was sighted along the barrel of a rifle and the reflected energy picked up and converted by an image tube into a visible picture.

No matter how dark the night or how well the enemy was camouflaged, he showed up in the sights.

Because of the long-range sensing capabilities of infrared gear and the speed of aircraft, the two have been combined to provide unusual, fast and useful data.

Ontario's Department of Lands and Forests has just taken delivery of a Canadian-built IF detector or "fire mapper," as it is known to the staff. The detector will be slung in a pod under forest patrol aircraft to pinpoint incipient fires while they are small and can be easily extinguished by water bombers or ground crews.





*hatch on T-33 jet shows recorder used with infrared probe.*

of the technique has been under  
for six years and will replace ground  
s. While similar detectors are  
able in the US, this is the first time  
has been built in Canada.

oster, of the protection branch of  
s and Forests, foresees other uses for  
infrared equipment. "There's no  
n it couldn't be adapted for thermal  
ys of our rivers and lakes," he says.  
it could also be used for mapping  
lines. Knowing water temperatures  
d also help to decide which fish would  
in what waters."

ft using the device can do their  
from altitudes up to 10,000 feet.  
ecent test in the US, a similarly  
ped plane was able to detect the heat  
a backyard barbecue.

reat Lakes investigation unit of the  
tment of Transport used infrared  
on instruments in gathering fast and  
e surface water temperature data  
the Great Lakes. The long-distance  
ometer is mounted on an aircraft  
own on a zig-zag course. Extensive  
g whereby readings of the infrared  
ments were compared to readings  
from a surface vessel proved the  
ty of the aerial survey. Temperature  
nces of only half a degree were  
ent.

An extension of the infrared detection  
device is the infrared scanner which  
records heat patterns called thermograms.  
Strikingly similar to conventional photo-  
graphs, thermograms depict the surface  
temperature distribution of an object. Black  
areas are "cold", white areas are "hot"  
and various shades of grey indicate  
temperatures in between.

In the medical world, thermography is  
seeing increasing use. Measuring heat  
emitted through the skin at various points  
on the human body is proving valuable  
in the diagnosis of tumors, arthritis and  
aids in medical observation. By pictorially  
presenting these surface temperature  
patterns it has even been possible to  
detect early internal cancer. Thermography  
has been successfully used in revealing  
a pending stroke — since an abnormally  
dark or cool area denotes a blocked or  
narrowed artery.

Such pictures are based on the fact that  
the average internal temperature of the  
healthy body remains essentially around  
37 degrees centigrade. The skin tempera-  
ture fluctuates widely, depending on  
such factors as the increased heat  
production of tissues and vascular  
abnormalities. It is these differences that  
assist the medical experts.

Agriculture has also benefited from  
infrared investigation. Aerial photographs

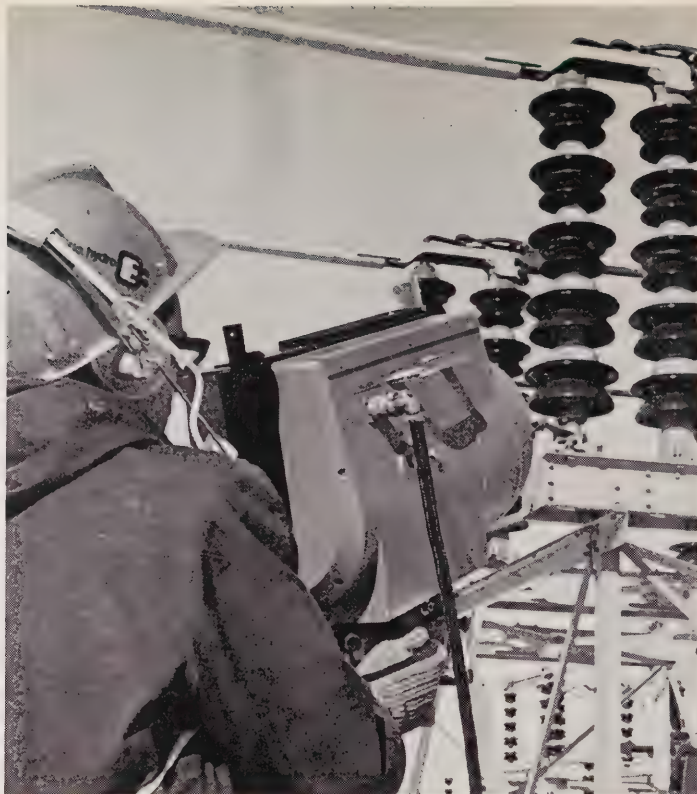
sensitive to infrared reveal diseased plants  
before the disease is visible to the naked  
eye. Colored pictures show healthy,  
well-watered plants in bright red in  
contrast to those carrying disease, which  
show up as ugly dark brown blotches.

Forests can be surveyed in a similar  
manner since unhealthy trees emit tem-  
peratures five to 10 degrees above normal.  
And the invasion of insects in trees can  
also be detected. With fire, insects and  
disease causing as much as \$20 billion  
damage to agriculture in the United States  
each year, some of that toll can obviously  
be saved by early remote sensing of  
troubles. One US official says that "every  
dollar spent on remote sensing can yield  
\$5 in savings."

Aerial survey with an infrared detector  
can also pick out different kinds of crops  
and trees. These variances, when turned  
into electrical impulses, can be fed into  
a computer and a map produced to indicate  
each crop's acreage.

In industry, IR applications are constantly  
increasing and seem unlimited in scope.  
For example, infrared radiation may be  
employed to monitor the thickness of hot  
metal in a rolling mill, holding it to a  
tolerance of .001 inch as it flashes along at  
90 miles an hour. Electronics firms are  
using the radiation given off by tiny





*In contrast to normal photograph, thermogram of girl reveals surface temperatures. Note lighted end of cigarette. Other photos show Ontario Hydro crew testing mobile infrared device to spot overheated joints.*



circuits to determine whether they are functioning correctly at proper design levels, or whether defects are causing over-heating.

At the Northern Electric Laboratories in Ottawa, the use of infrared instruments is a necessary part of research into solid state fields. Here, a spectrophotometer is used to determine the characteristics of semiconductors, ceramic and ferrite metals and to pick up impurities.

Sensing devices utilizing infrared emission are employed at Northern's chemical electronic centre to control the growth of single crystals of sapphire. In other areas of the company's operations, infrared devices keep a constant watch on the thickness of layers in the production of transistors and integrated circuits.

Where the unseen influence of infrared will turn up in future is unpredictable, but perhaps a unique application at Expo 67 gives some indication. There, a harmless but very real infrared beam was used to transport stock quotations from the 19th floor of the Montreal Stock Exchange to closed-circuit television units in the Canadian Pavilion. □

## Spotting trouble before it occurs

An Ontario Hydro electrical maintenance crew has been using an infra-red device to pinpoint potential trouble spots on electrical connections.

On recent tests, a mobile unit covered 6,000 miles, visited 76 transformer and generating stations and detected 226 possible sources of trouble. "Some had to be repaired immediately to avoid a major breakdown while others were less urgent," says an engineer. "We detected one bad joint from a range of 1,000 feet."

The unit employs an electronic camera that is extremely sensitive to temperature change — a difference of less than a degree will show up on the unit's video display tube. This makes it ideal for detecting joints that are overheating and may eventually cause a power interruption. Apart from being mounted on a van, it may also be operated from an aerial bucket or even from a helicopter.

On the evaluation program, the crew recorded temperature differences on connections from three degrees centigrade above normal right up to 200 degrees.

The unit can scan hundreds of joints an hour, making it possible to check a transformer station in a single day. [



# long hydro lines

## clear jobs

the Bruce nuclear project looming large on the shore of Lake Huron midway between Kincardine and Port Elgin, several commitments have been made by Ontario Hydro. John Horton, superintendent of the existing Douglas Point nuclear power station, has been made manager — operations of the new Bruce establishment. He will oversee operation of the Douglas Point station, the new 3,000,000-kilowatt Bruce generating station and the new Bruce heavy water plant. Mr. Horton has been at Douglas Point for two years after a move from a similar position at the Nuclear Power Demonstration plant at Rolphton. John Stratton has been named construction manager of the Bruce generating station. No stranger to the area, he served as first general superintendent and later construction manager of the Douglas Point station during its peak construction period. From there he assumed the construction manager's role at Hydro's \$570 million Pickering nuclear station, 20 miles east of Toronto. John White, formerly public relations officer at the Pickering plant, has been made public relations officer for the Bruce project establishment. The vacancy at Pickering is being filled by John Fulton.

## Hydro director dies



Barnes

William H. Barnes, Ontario Hydro's director of labour relations for 12 years, died last month in Toronto. He was 59.

Born and educated in Prescott, he served with the Canadian Army during World War II in Italy, France, Holland and Germany. During his war service he was mentioned in dispatches and awarded the Oak Leaf.

From 1945 until the beginning of 1948, Mr. Barnes was identified with the Federal Department of Labour as district supervisor, Canadian Vocational Training. He joined Ontario Hydro in March 1948, served as personnel officer at the Deseronto and Deseronto generating stations on the Ottawa River and the Sir Adam Beck-Niagara generating station No. 2 and the Lawrence Power Project.

In August 1957, Mr. Barnes was appointed director of industrial relations. The title was changed to director of labour relations in 1962.

Mr. Barnes was a member of Stamford Lodge; the Board of Directors of Metropolitan Toronto; the Canadian Club of Toronto; the Electric Club of Toronto. He was also a member of the Ontario Manufacturers' Association; Toronto Construction Association; Personnel Association of Toronto; Canadian Electrical Association and the American Management Association.

## Getting ready

Contracts worth \$140 million have been awarded by Ontario Hydro for turbine-generators at two new stations.

An \$85 million order went to James Howden and Parsons of Canada for four 800,000-kilowatt generating units to be installed at the Bruce nuclear power station, on Lake Huron. A \$55 million order covering four 575,000-kilowatt generating units for Lennox generating station, on the Lake Ontario shoreline about 20 miles west of Kingston, has been awarded to Canadian General Electric.

## Saved life

Twenty-year Collingwood PUC veteran Jim Dance, who is credited with saving a workman's life, has received the Electrical Utilities Safety Association meritorious action award. It was presented by EUSA manager Harry Flack at a Barrie meeting of the AMEU.

Last July, a falling tree struck a Hydro line leading into a home. The force tore an insulator from the side of the house and hurled it 100 feet, striking William Kennedy on the head.

Witnesses said Mr. Kennedy, a partner in a tree removal firm, had stopped breathing when Mr. Dance arrived. Mr. Dance jumped from his truck and began resuscitation immediately. Mr. Kennedy began breathing again and is now fully recovered after a lengthy stay in hospital with a fractured skull.

Another Collingwood PUC employee, Appy Sikema, will receive a similar award for reviving 10-year-old Robin Gillman, who climbed a Hydro pole and touched a platform-mounted 4,000-volt transformer.

## Olé for OMERS

The 52,000 municipal workers in Ontario who are members of OMERS, the Ontario Municipal Employees Retirement System, are getting a good return on their pension dollars. In fact, Allan W. Reeve, secretary-treasurer of OMERS, points out that a 10 per cent increase in benefits inaugurated last year will give a 40-cent return a year for each dollar in the fund.

This compares with a return of 35 cents for Metro Toronto's civic plan, 31 cents for the Toronto civic plan and the Metro police plan's 25 cents. However, the police plan does have a 30-year termination period so that a man joining the police force at 21 can retire at 51. The other three plans run to age 65.

OMERS, which began in 1963, now has \$104 million — all invested in Province of Ontario bonds. The money, which went into the fund from 1963 to 1967, is in 5 per cent issues. But last year, when benefits were increased, the five-man board of management negotiated a 6½ per cent return on debentures till 1973.

According to Mr. Reeve, the plan has been successful beyond anyone's expectations, although no particular efforts have been made at high-pressure selling. A total of 380 provincial municipalities out of 960 are now in the plan. In addition, 535 public utilities, school boards, conservation authorities, homes for the aged, library boards and similar groups are members.

Increased membership and increased salaries, with corresponding increases in contributions, swelled the OMERS fund by \$31 million in 1968. There are prospects it will increase by another \$40 million this year, says Mr. Reeve.

## Powerhouse of knowledge

What better gift could Peterborough's all-electric Trent University receive than a generating station? That's exactly what it got from the Canadian General Electric Company.

The power station was part of a \$250,000 donation which included cash and 40 acres of land adjoining the campus. It was



made in connection with Trent's Development Fund, which is currently seeking \$5 million. It was the second time CGE has helped the university. In 1963 it donated \$150,000 and 100 acres of property, providing the site for most of the university buildings. CGE employees gave a further \$260,000.

Located next to the university campus, the hydro-electric plant has been supplying the electrical giant for 67 years. Originally, there was a powerhouse on the west side of the Otonabee River. It began to deteriorate in the 1920s and the present powerhouse was erected on the other bank. The day first power was delivered in 1923, the old structure collapsed into the river. About 10,000,000 kilowatt-hours are produced annually from three generators.

Trent will use the station to supply 25 per cent of its power requirements. But the bigger benefit will come with the station's automation and use for training engineering students. CGE will purchase additional power from Peterborough Utilities Commission to compensate for the station's loss.

## Under study

A committee of local utility commissioners in the counties of Lincoln and Welland has been formed to study the effects of regional government. A new political structure, which will turn 26 municipalities into 12, is to come into effect January 1, 1970.

Art Bennett, of St. Catharines, is the committee secretary. Other members are Frank Kaupp, St. Catharines; Henry Shantry, South Grimsby; C. J. Austrom, Chippawa; Parnell Matthieu, Beamsville; Gordon Klager, Fonthill; George Burley, Niagara Falls; C. N. Swayze, Welland; E. G. McPherson, Port Colborne, and Jim Miller, Thorold.

## So long, Smoke



*Lifting the lid*

One of the largest gatherings to say farewell to a Hydro personality took place in Chatham last month. The 540 guests were feting R. S. "Smoke" Reynolds, who retired from Chatham PUC after 40 years as general manager.

Speakers at the dinner included George Gathercole, Ontario Hydro chairman; P. R. Locke, St. Thomas, a past president of the OMEA; Jack Anderson, Leamington, AMEU president, and Ron Mathieson, secretary-manager of the AMEU. After the speeches, Mr. Reynolds, whom Mayor Garnet Newkirk described as "a fine, warm, able person," shook hands with most of the 540 well-wishers.

Mr. Reynolds has led an extremely active life. In sports, he was on three Grey Cup-winning Queen's University teams, played hockey all over Southern Ontario and has been a member of the executive of the Ontario Hockey Association for over two decades. He was a familiar figure around Ontario utilities as a worker for

the old Pension and Insurance plan that has given w OMERS. For three decades Smoke has served on Chatham hospital board and has been a member of the city's recreation committee.



*Saving gas*

Smoke is seen aboard a bicycle back in 1942, when power replaced rationed gasoline. He is also pictured as one of his farewell gifts — a stereo set from the commission. Smoke, who is on the right, gets help from his successor, C. Leach, Commissioner Guy Morrison and Mrs. Reynolds. Gifts included a book of memory from the commission, a recorder from the staff and a painting from those at the commission. He also received the spurs he used in his early career, which were mounted on a plaque, and a hockey stick.

## Ocean fission?

A two-year study report by a US presidential-appointed commission has recommended an investigation into the feasibility of locating nuclear power plants underwater on the continental shelf.

The Commission on Marine Science, Engineering and Resources suggests that the US Atomic Energy Commission proposed National Oceanic and Atmospheric Agency (NOAA) jointly support the building of an experimental submerged nuclear plant. It would supply power for a NOAA program of continental shelf laboratories and various government and industry research activities.

The prototype would serve to determine the economic and technical feasibility of locating commercial-sized power plants under the ocean near metropolitan centres. Aside from overcoming the scarcity of coastal sites for nuclear plants, "reduction of thermal pollution and increased safety would be additional advantages of using offshore sites," the report says.

## Super mom

Mrs. William O'Hara is nothing less than a super mom — a woman who by choice washes diapers seven days a week and has to be.

In the last 12 years, she and her husband, a Toronto meter department employee, have cared for over 150 children as foster parents for the Children's Aid Society of Metro Toronto. When their own family of three began to grow up, they decided to take children into their home and have now a family of two of these youngsters.

For the last three years, Mr. and Mrs. O'Hara have looked after children in need of emergency care. Most of the calls come between supper time and sunrise and there are more on weekends and holidays.

"We've given youngsters dinner at 1 a.m.," says Mrs. O'Hara, noting that most come in hungry and sometimes dirty.



## Exercise in frustration

year a coroner's jury looking into the drowning of a seven-old boy in the power canal at Niagara Falls recommended a fence be erected along the canal. Ontario Hydro did just spending \$200,000 on a chain link, barbed wire fence along the canal's entire length.

In a recent inspection of the fence, however, Hydro's security found three large holes in the chain link. They had been cleverly fashioned with a pair of wire cutters. "No trespassing" signs, erected as an extra precaution, have been defaced with gun blasts.

## Honors for the colonel



Kennedy

Lt. Col. A. A. Kennedy has been appointed honorary Lieutenant Colonel of the Hastings and Prince Edward Regiment of Belleville. The appointment was made by the Minister of National Defence, Leo Cadieux.

Col. Kennedy, who has been an Ontario Hydro commissioner since 1955, was a member of the Grey and Simcoe Foresters before World War II. During the war he was commanding officer of the Hastings and Prince Edward Regiment. He served in England, Italy and Northwestern Europe.

He was awarded the Distinguished Service Order for gallantry in action.

On return to civilian life, he was elected to the Owen Sound Board of Control and served for about 20 years. He is a past president of the Georgian Bay Municipal Electric Association and also of the Ontario Municipal Electric Association.

## Death of a giant



the beetle

It was only a sapling when Canada was born. It lived long enough to celebrate the nation's Centennial. But it fell victim to Dutch elm disease and had to be toppled a few months ago.

The tree, planted in 1865, was one of the largest elms to be found in Perth county. It measured over 25 feet around the base and had a diameter of seven feet. It stood on the banks of the Grand River at Trowbridge. Forestry foreman Norm Stirling, who headed the Ontario Hydro crew that cut down the elm, says it was the biggest he's had to deal with.

# municipal briefs

**Toronto Hydro** is getting out of the retail business. The commission decided it will close its Carleton Street store this summer because it's a losing proposition. J. J. Lowry, director of consumer services, said the store lost \$55,000 last year on sales of more than \$200,000. Hydro stores were started in the 1920s to promote the use of electrical appliances. At one point, the utility had five of them. After World War II, private outlets stepped into the field and their large sales volumes resulted in more favorable prices. The utility's appliance repair service will be retained.

**Establishing** a municipal electrical commission isn't as simple as might be thought. Back in 1966, citizens of Vaughan Township voted for their own commission to take over service provided by Ontario Hydro. But the wording in the plebiscite wasn't correct. Another vote was held last December with an overwhelming approval again being given. Then the council missed a deadline to enact a by-law to establish the commission. It got an extension from the provincial government and the legislation was forged in April. However, elections to the commission won't be held until December, 1970.

**Underground** in '75 is the target in Dunnville. That's the date the local Hydro commission hopes to clear the streets of overhead utility wires. Most wires are already underground. The balance will be buried as rapidly as time and money will permit. Dunnville's underground program was started in 1951.

**Lindsay Hydro's** renovated quarters are to be named the George Baldwin building in honor of one of its commissioners. The building was opened in Centennial year after a \$30,000 facelift. Mr. Baldwin has been a member of the commission for more than two decades. His brother, Henry, of Oshawa, is this year's president of the OMEA.

**Wilfred (Mike) Hogan**, of Lindsay Hydro, will have a comfortable retirement — thanks to one of his going-away gifts. At a retirement dinner he was presented with an easy chair by the commission and a watch by fellow employees. Mr. Hogan started work for Lindsay Hydro in 1920, but left three years later for the United States. He returned in 1942 and served continuously until his retirement. For his work on the Parks Board and Recreation Commission, he received a set of town-crested coasters from Mayor John Eakins.

**Amos Waites**, former mayor of Mimico (now part of Etobicoke) and his wife, Louise, recently celebrated their 50th wedding anniversary. The couple were "at home" to hundreds of their friends including Etobicoke Mayor Edward Horton, Etobicoke Hydro commissioner Clark Wardlaw and MPP George Ben. Mr. Waites is probably the only man in Canada who won an election and lost an election by one vote. In 1927 he won the seat of deputy reeve by one vote, and in 1944 he lost the race for mayor by one vote. Two years later he became mayor by a slim 12-vote majority.

**Sault Ste. Marie PUC** employees paid tribute to their grand old man at a dinner gathering. George Walker, who retired at the end of 1968 with 50 years of service, was the man in the spotlight. He started as meter reader in 1918, became sub-foreman in 1955 and superintendent — a position his brother Horace now holds — the following year. In 1965 he moved into the engineering department. Mr. Walker was presented with a wallet by the commission.



Preston PUC employees got a night out on the commission for their safe work. The utility went through 1968 without an accident and in so doing won the Electrical Utilities Safety Association plaque for smaller utilities. Rather than just making it verbal, the commission's congratulations took the form of a banquet at Leisure Lodge.

Welland-Port Colborne and area chapter of the Ontario Electrical League picked a novel time to announce its new executive. It was done at the group's annual Ladies' Night. The executive includes R. Jarvis, president; L. Blais, past president; T. Hollingshead, vice-president; W. Elliott, secretary and J. Colley, treasurer.

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## speaking of pr

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*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

"Bury the wires" cries a newspaper headline. Several hundred miles away another echoes "Ratepayers declare war on overhead line". As if in answer, a third explains "Underground hydro too rich for town".

Municipal utilities in Ontario are recognizing the importance of sharing with their customers the facts about underground wiring, according to a recent survey of press clippings from across the province. Although underground wiring can be traced back to at least 1941, it is only during the sixties that technical progress and public interest have blossomed together.

Overhead lines have attracted public attention mainly for aesthetic reasons. This single-mindedness serves to emphasize that an electrical utility should tell the rest of the story, including its policy and plans for underground. Investment in overhead lines, for example, cannot be ignored. Nor can the increased costs of underground be automatically assumed within existing rate structures.

Public communication of utility policy in a reasoned and easily understood manner can make an underground program run a little smoother. A utility that makes itself understood will probably avoid the type of street-corner poll that calls on the PUC to remove all street-corner poles.

\* \* \*

Harrow Hydro was one of the first Ontario utilities to issue an easy-to-read annual report for 1968. To tap customer opinion, they also enclosed a return postage-paid questionnaire asking customers' views on service policy, billing frequency, and repairs. Etobicoke Hydro distributed their annual report, "Hydro Highlights 1968," to some 83,000 customers. Of attractive appearance and moderate cost, these direct mail pamphlets are one aspect of a practical and effective communications program being adopted by utilities across Ontario.

\* \* \*

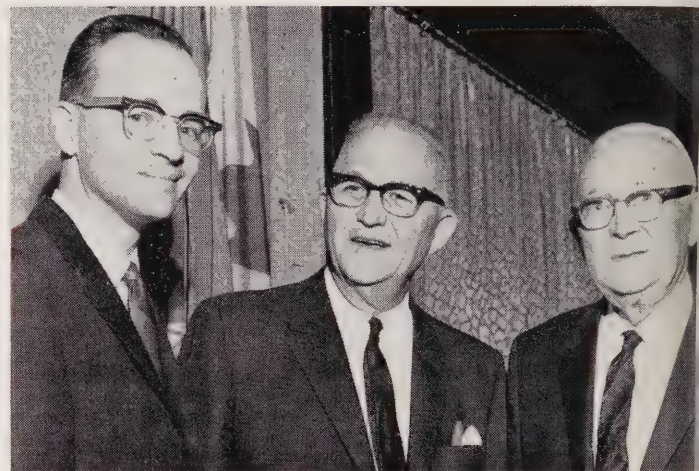
According to Oakville PUC, safe driving means more than a reduction of accidents. They decided to send 41 employees who drive vehicles for the PUC to a local skid control school to take a course in defensive driving. Although the utility now has an enviable safe driving record, they believe the course is an effective public relations effort and will let the public know their concern for the mounting highway accident toll.

\* \* \*

Carrying the subject of trucks forward, Dunnville PUC has taken a refreshing approach to the relationship between truck drivers and the customer. On the side of each Dunnville PUC truck is the Christian name of the employee who normally drives that vehicle.

Written in careful script above or near the utility identification extends a note of informality and sincerity. No doubt the response to this candid identification with mixed feelings, even the most humble among us appreciates public notice of good works. And that, after all, is the stuff that makes for good public relations.

## Salute to a president



*A family affair*

Henry Baldwin was the centre of attention when 60 business and municipal officials gathered in Oshawa's Genosha Hall to honor him as new president of the Ontario Municipal Electrical Association.

Among the list of dinner speakers were AMEU president, Mr. Anderson, of Leamington, and Ontario Hydro Chairman George Gathercole. Mr. Anderson presented the OMEA president with a book of memory, while Mr. Gathercole presented him with a gavel, symbolic of the office.

The evening was turned into a family one with the attendance of Mr. Baldwin's son Norman, left, and his brother George, right. Hydro service runs in the Baldwin family. Norman, who now lives in Glen Falls, N.Y., worked for Ontario Hydro during summer vacations, and George has been a member of the Lindsay Hydro commission for more than two decades.

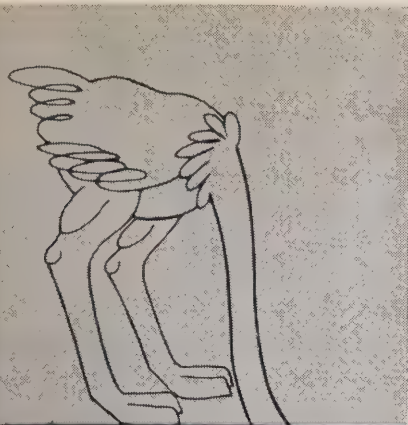
In replying to the evening's tributes, Mr. Baldwin traced the birth and growth of the public power enterprise in Ontario and said: "The opinion and influence of the OMEA is of great consequence to Ontario Hydro, the provincial legislature and the people of Ontario. It was the voice of those who gave us our unique system of hydro-electric service and is the voice of those who today continue to carry out the responsibilities of operating a municipally-owned electrical distribution system — the best in the world."

## April energy production

Primary energy provided by Ontario Hydro in April 1969 totalled 4.85 billion kilowatt-hours, an increase of 9.7 per cent over the same month a year ago. For the first 4 months of 1969, the total is 20.64 billion kilowatt-hours, up 7.4 per cent over the same period last year.

Adjusted for seasonal influences, primary energy demand in April was 4.93 billion kilowatt-hours, 0.8 per cent less than the previous month. The seasonally adjusted total for April represents 59.20 billion kilowatt-hours at annual rates. This is 425.57 per cent of the energy demand in 1949.





## as don wright sees it

nuclear electric power and the humble herring may not appear to have much in common, but British electrical authorities are beginning to think that fish and fission are pretty closely related. In fact, if things shape up as expected, the utilities may be able to take the edge off their power bills by offering customers half a dozen mackerel with each meter reading.

According to a spokesman for the prestigious White Fish Authority, "every British power station using sea water for cooling may soon have a fish farm attached to it."

He says it's been proved that fish raised in the warm water discharged from a nuclear station in Yorkshire grew much faster than their counterparts at large. More specifically, Dover sole grew to marketable size in 18 months in the nuclear fish farm, compared to the three to four years required for the poor soles left out in the cold.

The White Fish Authority believes that a major new industry may well be in the making and that this power station sideline "might result in a substantial reduction in the present charges for electricity."

Cautious fellows, these White Fish chaps. They don't intend to proceed with their underwater underosias without a green light from the housewife. Fish-tasting stations are being set up across the nation wherein m'lady will be asked to judge the relative succulence of fish raised in captivity at nuclear power stations and those from more conventional environments.

It's to be hoped every precaution will be taken to guard the tasters against coercion on the part of the coal and gas interests. Lack of seasoning or strategically implanted bones must not be allowed to influence decisions which may ultimately affect critical rates and the ability of the industry to compete with other sources of energy. Let no one say there is anything fishy about the scales of justice.

Another by-product of the British utilities industry, a rather nasty sort of stuff called pulverized fly ash, seems to be very "in" at the moment and selling like the proverbial hot cakes. Last year, the Central Electricity Generating Board sold almost four million tons of fly ash, as we call it, to the construction industry at home and in Europe. This is about four times the total Hydro produces in the course of a year — most of which has to be disposed of at considerable expense.

Steps are being taken to make use of this waste

and markets are being promoted. But so far, the line-ups for fly ash at our coal-burning stations have been very easy to control. Compared with Britain, we are very much of a waste economy and it's more difficult here to wrap up our refuse in packages attractive enough to exchange for coin of the realm.

■ Speaking of waste economies, one of the more fascinating sidelights of the historic Manhattan Project, which ultimately resulted in the atomic bomb, is drawing to an end with the gradual return of silver bullion to the US Treasury. Nearly 14,700 tons of the precious metal were borrowed in the early 1940s by the nuclear authorities as a substitute for war-scarce copper.

At one time, the total silver held by the Atomic Energy Commission, if converted to silver dollars and stacked on edge, would have extended from New York to Chicago.

Instead, the silver was substituted for copper in bus bars and windings for huge magnets used in separating U-235 from other uranium isotopes. Silver has the highest electrical conductivity of any natural substance.

The magnets were said to be 100 times larger than any previously built. They were so powerful that the magnetic pull on the nails in workers' shoes made walking difficult. Wrenches were snatched from workmen's hands until complete kits of non-magnetic tools could be developed.

■ A new technology called excitonics has the scientific world atwitter, according to Business Week, with the prospect of a new way of transferring energy. It goes on to explain that hyperactive electrons called excitons may prove helpful in many lines of endeavor from computer technology to medical research.

While we fail to grasp all the details, these subatomic particles appear to have been discovered in both organic and inorganic crystals. As if that weren't enough, they tell us that when electrons in some crystals are bombarded with photons of specific wavelength (not just any old photon) they not only yield excitons, but the excitons get so worked up that they split into "triplet excitons." And this is where the sad part comes in.

The triplet excitons carry energy around inside the crystal and then escape but, on the very verge of freedom, they die.

Dead triplet excitons may be a heart-rending sight, but the slaughter is probably justified and less tragic than it may appear. The average life span of a triplet exciton is only one-hundredth of a second, which is hardly long enough to establish any real emotional involvement. And in the fatal process of escaping, the triplets free two photons . . . which somehow makes the whole thing worthwhile.

■ If there is any one social phenomenon outstanding at the moment it must surely be our preoccupation with hair. Once considered something to shave off or plaster down and forget, hair now seems to have obtained new stature. It's become something to nourish, feature and preen wherever (within reason) it can be cultivated.

Like it or not, beards and sideburns are having their innings and one might reasonably expect this extension of our horticultural horizons to assuage men whose efforts in the past have drawn nothing but failure on the barren wastes at the top of the cranium. But a challenge remains a challenge, it seems, and the struggle to achieve a

vegetative beach-head above the treeline at the nape of the neck is taking a new and more serious direction.

Formerly confined to the futile application of various unctions ranging from bear grease to sophisticated mixtures of animal excrement and wild berry juice, the trend in modern epidermal agriculture is to the transplant. Almost always successful, they tell us, this technique involves transplanting plugs of scalp from thick growth areas at the back of the head to the lunar landscape at the higher altitudes.

According to our information, up to 200 grafts will be required to alleviate extreme baldness and this could cost as much as \$5,000.

Where the hair will come from in billiard ball cases is not explained, but prospects are warned that if the transplanted hair is sparse to begin with, it will remain that way in its new location.

Presumably those areas from which the sod has been removed will also remain on the barren side so that other sources of supply should be investigated if the technique is to attain its full potential. Animals such as the ape or hyena might prove satisfactory for run-of-the-mill transplants while special effects might be attained via the skunk, zebra and porcupine.

■ Always among the leaders in educational innovation, the University of Waterloo is in the news again for a program of studies it hopes to initiate wherein the students themselves will pretty well determine the curriculum and which will require "no pre-determined admission criteria."

What this means is not entirely clear, but it seems to suggest that any footloose soul with no specific objective in life other than a burning desire to avoid work will be welcomed into the fold. He will then be free to meditate and cast about in the academic fish-pond for a course of studies compatible with his outlook and mental capacity.

Realists that they are, the authorities say simply that students completing the course "may petition for the granting of a degree."

Therein lies the true cunning of the academic mind. Anyone successful in obtaining a bonafide degree under these circumstances will have no trouble making his way in the fields of politics or sales.

■ Electricians appear to have made history with the rather favorable settlement they managed to win in recent negotiations. One question the results should answer is whether or not money really is the over-riding criteria in determining our lines of endeavor. If so, we can expect to see a steady procession of doctors, lawyers and university professors casting aside their former disciplines in favor of friction tape and overalls.

Equally intriguing is the settlement gained recently by the Toronto Harbor Commissioners' employees who will now be paid time-and-a-half for vacations. The logic here is quite apparent. The harder you work the more you should earn and who doesn't work 50 per cent harder on holidays?

□



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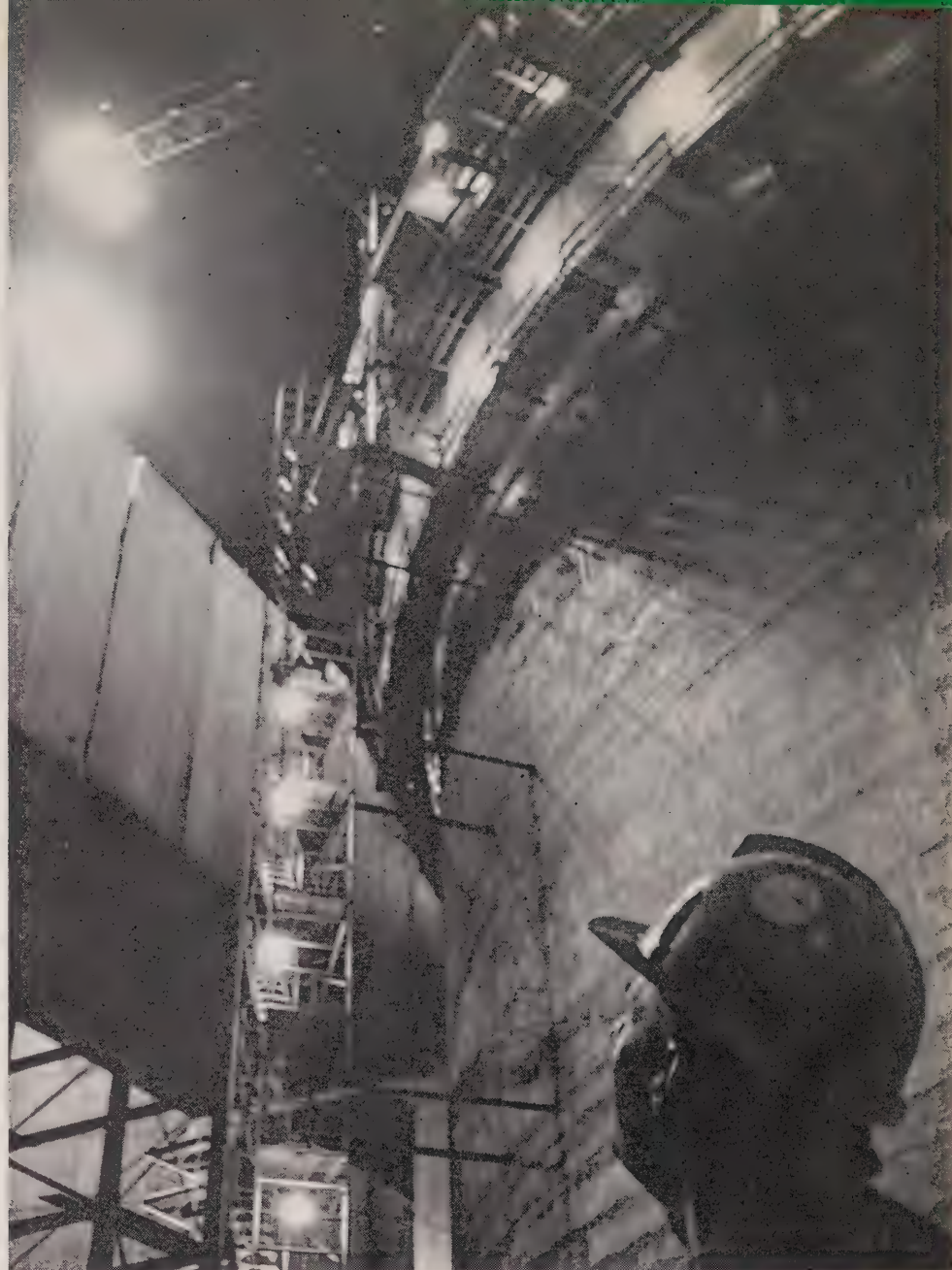


**Follow the leader?** Well maybe, but Hydro is usually the one in the lead.

Like the establishment of a research division over half a century ago. Tests conducted by the division determine the most durable type of paint to keep transmission towers maintenance-free for longer periods. It's studies like this that have helped to keep Ontario's electrical power rates among the world's lowest. And that's quite a bargain.



2A20NER  
-495



- the big pour
- pollution peepers
- muffling the din

# ontario hydro news

july-august/1969







# news july-august/69

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## the cover

It's night. But the job goes on, just the same. Working around the clock, it took construction crews a little over seven days to encase the 159-foot high vacuum building at the Pickering power station in a three-foot thick wall of concrete. For a description of this non-stop and precision operation, turn to page 9. Photo: Ron Brown

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## Viewpoint

# One score and four

Someone once observed that change is really the only constant, but it is an insidious process and tends to slip by unnoticed until something calls for a pause in the daily pace and holds up the mirror of retrospect.

The announced retirement of D. P. Cliff, Ontario Hydro's first vice-chairman, might be considered such an event. It's been 24 years since Mr. Cliff commenced his Hydro association with the Dundas Public Utilities Commission, and his decision to retire affords an opportunity for reflection. Even the briefest backward glance suggests how briskly the winds of change have been blowing over Hydro during the last quarter century.

When Mr. Cliff served his first term on Dundas PUC, in 1945, water power was Ontario's sole source of electricity. Hydro now operates 67 of these plants on the great rivers of the province and this romantic phase of its operations is coming to a close. Of the present \$2.3 billion expansion program, which will add 12,400,000 kilowatts to generating resources, only 650,000 kilowatts will come from water power. The last of this will be in service by 1971 and no further hydro-electric development has been committed. More may follow, but coal and nuclear plants are the newer stars in the Hydro firmament.

During his 24 years with the Hydro family, Mr. Cliff has seen the people of Ontario turning more and more to electricity for the good things of life. From 1945 to 1968, peak demands rose more than five-fold from 1,850,000 kilowatts to 10,000,000 kilowatts. Consumption per residential municipal customer grew from an average of 2,400 kilowatt-hours in 1945 to 7,430 in 1968.

Citizens now enjoy one of the highest standards of electrical living anywhere.

In the matter of rates, Mr. Cliff can look back on his period of Hydro service with satisfaction. The average cost per kilowatt-hour for urban dwellers rose only from 1.10 cents in 1945 to 1.19 cents in 1968 — about eight per cent.

In the light of present inflationary pressures, such a remarkable record of cost containment can hardly be expected in the future.

Even during the relatively short period in Hydro history in which Mr. Cliff served on the provincial commission, many fundamental changes have occurred in Hydro's methods of doing business.

Since 1956, nuclear power stations have been transformed from the drawing boards into steel and concrete; electronic data processing has been introduced and developed into a major function; transmission at 500,000 volts has commenced and inter-connections have been strengthened and established with systems supplying the electrical requirements of a vast area of North America. With the arrival of natural gas from the West in 1958, Hydro was required to embark on a vigorous marketing program to protect its markets and help maintain low rates.

Many other important developments have, of course, been initiated since Mr. Cliff took his place on the commission and, in his own quiet and efficient way, the man from Dundas has made an important contribution. During his career, Mr. Cliff earned the respect and confidence of all at Hydro, including the municipalities on whose behalf he worked devotedly. Good will engendered over a quarter of a century is not the least of his contributions.

See "Bud Cliff steps down" — Page 22.



# Smoke gets in their eyes

When Alex McRae set out 25 years ago in his converted lifeboat the Juicy Scoopy to make tea from water taken from the St. Clair River, his actions were no doubt considered a little eccentric by the local habitués.

In fact, McRae was a chemist with an oil company, and his outings on the river were part of a pollution control program. He made the tea because it "seemed to magnify the bad taste of unwanted chemicals in the water." Back in the lab, though, the samples were subjected to more scientific scrutiny.

Today, the monitoring of pollutants in both water and the atmosphere is big business involving a broad spectrum of industry. For knowing the nature of pollution — one of the most pressing problems of our time — is the first step toward finding a solution.

Modern sleuths in pollution detection use every technological aid at their disposal, from computers to balloons. An instrument developed by an Ontario firm, Barringer Research, will be flown by balloon this summer into the upper atmosphere to record the clouds of pollutants over Chicago.

The instrument being used in this NASA-

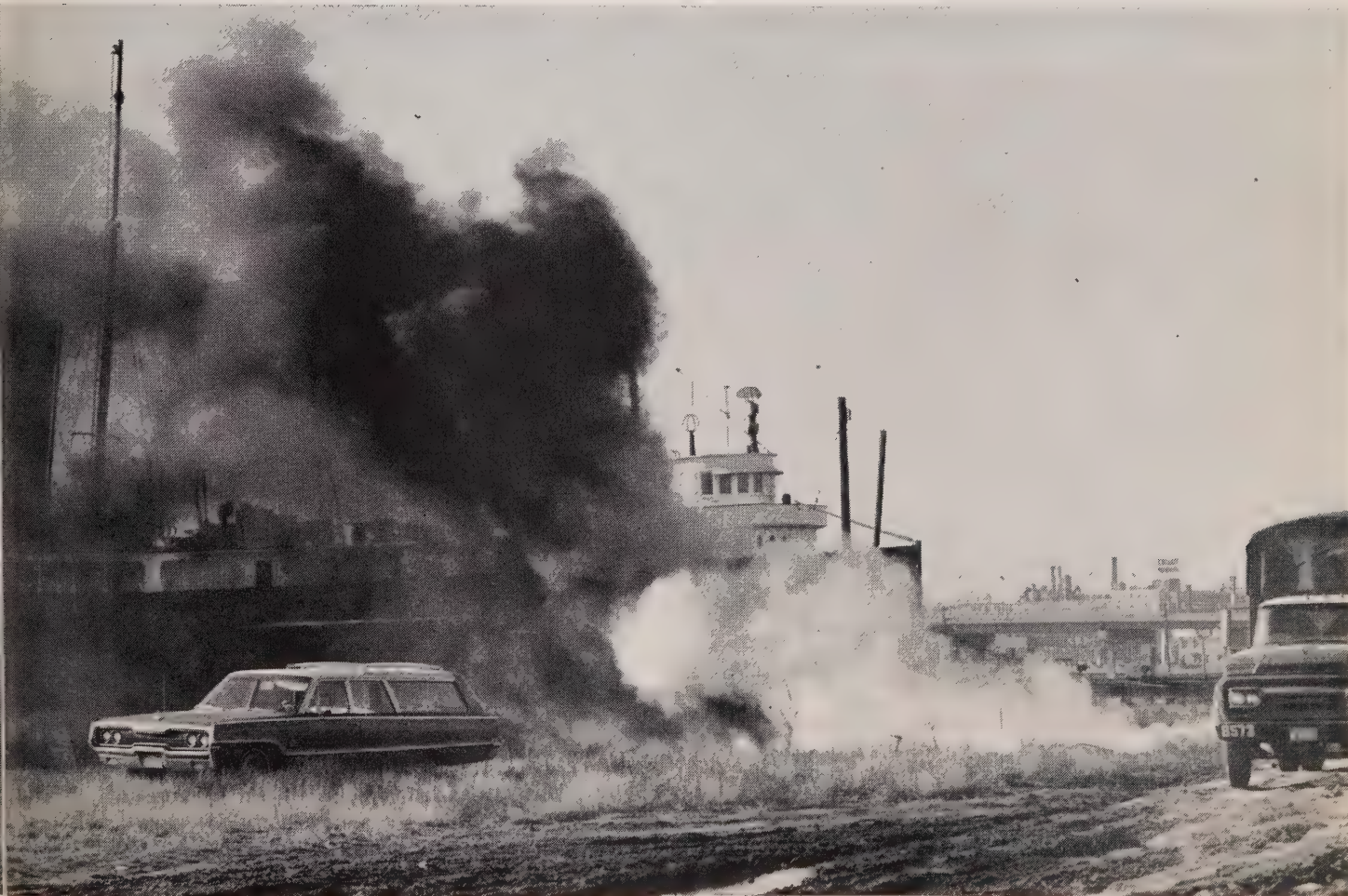
sponsored experiment is called a correlation spectrometer. It is capable of monitoring pollutants both instantaneously and continuously.

If the experiment succeeds — and Barringer is confident it will — the next step will be to map the distribution of sulphur dioxide and nitrogen oxide gases across the whole of North America.

Policing of Ontario's atmosphere is primarily the responsibility of the Ontario government's Air Pollution Control Service, which last year expanded its monitoring network and absorbed several municipal monitoring systems.

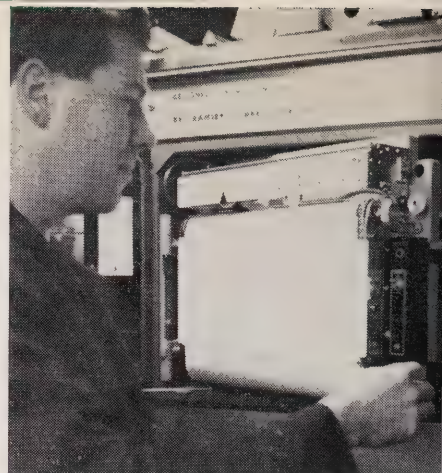
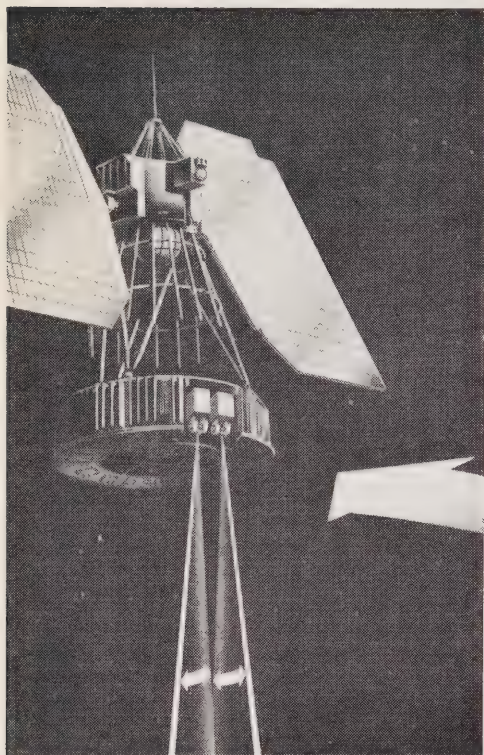
Tabs are kept on the overall pollution picture by strategically located air-sampling stations that measure the concentrations of sulphur dioxide, carbon monoxide, hydro-carbons, hydrogen sulphide, nitrogen oxides and particulate matter. Data from these stations is telemetered to the service's Toronto office where it is analyzed by computer. Industrial sites are similarly monitored.

Four meteorological towers in Toronto, Windsor, Hamilton and at Courtright, near Sarnia, measure temperatures and wind velocities at heights up to 300 feet. Data from these towers is telemetered to Toronto





*Apart from being installed aboard aircraft, right, and boats, plans even call for satellites to carry pollution detection equipment. Photo on far right shows recording instrument at the base of a Department of Health meteorological tower.*



for computer analysis. And the service operates two mobile units laden with instruments to conduct spot checks on vehicle exhaust gases — a major source of air pollution.

Officers of the control service rate industrial smoke emissions according to a scale which shows five different shades representing smoke of increasing density. Emissions greater in density than the first shade are prohibited except for four minutes in any half-hour, when the second density is permissible.

Densities three, four and five are also prohibited, except in the case of a fire being lighted when three minutes of shade three are allowed in any 15-minute period. Companies exceeding these limitations are subject to prosecution and fines up to \$5,000 for a first offence and \$10,000 for each subsequent offence. Individuals contravening the air pollution control act are liable to a maximum fine of \$2,000.

Ontario Hydro employs its own pollution "detectives" who set to work measuring pollutants in the vicinity of projected coal-burning plants long before they actually produce power.

An extensive survey will begin this September around the site of Nanticoke power station, on Lake Erie, to establish the pre-operational levels of sulphur dioxide and other gases. The investigation, which will extend several miles inland from the site, is being undertaken in co-operation with the departments of Health and Agriculture.

The survey team will be equipped with four trailers packed with instruments for measuring wind speed and direction and the presence of sulphur dioxide and ozone. Measurements will be charted and also recorded on magnetic tape for computer processing. In addition, 22 units containing lead peroxide candles will be placed at strategic locations to furnish data on background sulphur dioxide levels in this mainly agricultural area. To ensure it encompasses all weather conditions, the survey will be run both summer and winter. Nanticoke is not due to produce first power until 1971.

Hydro recently stepped up its air pollution research program along all fronts and the number of readings taken across the province by monitoring equipment is fast

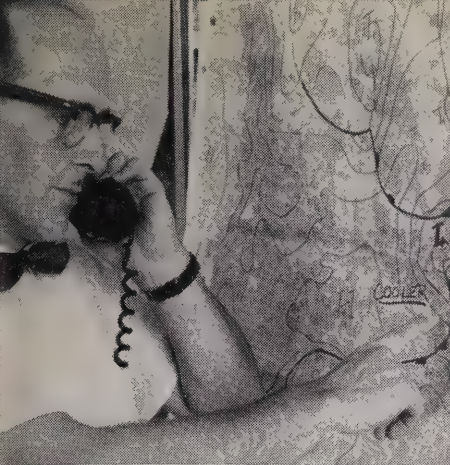
approaching 40,000 a month. A possibility for the future is the direct telemetering of data to a central point or to station operators who can take remedial action should air pollution in a particular locality reach unacceptable levels.

Such action might include the switch to coal with a very low sulphur content already an established procedure under certain meteorological conditions at the R. L. Hearn plant in downtown Toronto.

Initially, the research program will include the identification and measurement of pollutants emitted from coal-burning stations, preliminary studies of control methods and improved air pollution surveys. Vegetation and coal dust surveys are among other areas to be investigated. The program, estimated to cost around \$300,000 a year.

As if the complexities of chemical pollution weren't enough, sleuths from the federal health department are continually on a lookout for poisoning of the atmosphere by nuclear radiation. They do, in fact, conduct a nation-wide program of fall-out monitoring including the analysis of air particulates.





*Facets of Ontario Hydro's pollution research program include detailed meteorological studies, chemical analysis and the measurement of sulphur dioxide levels by strategically placed lead peroxide candles. Divers are seen preparing to install monitoring apparatus off Hydro's Nanticoke site, on Lake Erie.*

precipitation, milk, water, wheat, soil and even human bone.

Samples of airborne particulates are collected by air filtration at 24 stations across the country and analyzed daily. These stations are located at airports and are operated by the meteorological services branch of the Department of Transport.

Flow-type geiger counters determine total beta-radiation activity from precipitation samples, which are also determined by radio-chemical analysis for traces of strontium 90 and cesium 137 — isotopes present in nuclear fall-out. So far, levels of radioactivity in the atmosphere over Canada have remained well within limits considered permissible from a health point of view.

Activity in the field of water pollution is less hectic. One single agency — the Ontario Water Resources Commission — operates a network of 400 stations which take water samples each month and subject them to a variety of standard laboratory tests. A helicopter has recently been used to speed up the sample-taking procedures.

Aircraft and boats are used extensively

in the search for basic hydrological data and this sometimes involves plotting such conditions as currents and prevailing winds to give scientists a more accurate picture of the steps required to minimize pollution. It is here that the hydrology engineer — a new breed of individual who will be much in demand in the future — steps in.

"In our work," says Jack Bryce, of Ontario Hydro's hydraulic studies department, "the role of the hydrology engineer is becoming increasingly important.

"Firstly, we must get an accurate picture of national hydrological conditions to enable environmental studies to be made at sites where coal-fired and nuclear plants are to be built.

"Secondly, specific information is required for the plant design such as the presence of weeds, the action of ice and a knowledge of currents so that we won't have warm water released by the plants drifting back on us."

To help construct an accurate picture of Ontario's waterways, research vessels from a number of agencies have criss-crossed the Great Lakes towing meters which

automatically read current velocities and directions and register temperatures at a variety of depths.

The Canada Centre for Inland Waters at Burlington has installed a computer aboard its newly commissioned research ship, *Limnos*, for on-the-spot storage of data. And, in conjunction with the federal government, the centre has been using an aircraft to obtain a thermal picture of Lake Ontario.

Seven passes over the western end of the lake have been flown by a North Star aircraft equipped with infrared instruments that can detect temperature differences of one degree centigrade. Other instruments aboard the plane measured reflected solar radiation.

Yet a new controversy claiming the headlines these days is the fear that large thermal-electric power stations and other industrial plants which rely on lakes and rivers for cooling purposes will upset the balance of aquatic life by warming these bodies of water. Thermal pollution, as it is called, is actually a misnomer because the water is returned to the lake in a cleaner condition. However, the temperature is





raised about 15 degrees fahrenheit.

At full operation, a large thermal plant may need upward of 500,000 gallons of water a minute for cooling and one school of thought maintains that, as more stations are built, temperatures will rise and affect fish and other organisms. Others maintain that bodies of water like lakes Erie and Ontario are too large to be significantly affected and that the warmer water in the immediate vicinity of the stations will be beneficial to fish life.

Hydro experts are now investigating water conditions off the site of Nanticoke power station together with researchers from the Department of Lands and Forests and the Ontario Water Resources Commission. Further studies have been initiated at future station sites at Bath, on Lake Ontario, and at Douglas Point on Lake Huron.

Two main objectives have been set for the hydrological studies. The first, which Hydro carries out at all stations, is to accumulate information for design. Direction and magnitude of offshore currents are determined to establish the best location of station intakes and out-

falls. Ice and wind conditions are also taken into account.

The second and new phase of the studies involves environmental research. At Nanticoke, Stelco, which is building a huge steel mill near the power station, will share part of the cost of examining plant, animal and fish life in the area, conducting temperature and current studies and water sampling. The task may take over three years to complete.

The detectives of pollution must play a vital role if we are ultimately to avoid fouling the environment. But it is the public, which often vacillates between hysteria and lethargy, that must in the final analysis maintain its watchdog role.

*Canada Centre for Inland Waters research vessel Limnos carries a computer on-the-spot storage of*



# Shh....beware of boiler maker's ear

Sheila Kenyon

Whether it's from rock groups, aircraft or jackhammers, our increasingly noisy environment is cause for concern. Where decibel levels are high, many industries provide earmuffs or earplugs for employees. Trouble is, getting them to wear them.

Though practically extinct, the steam locomotive has left a permanent mark on medical terminology. Deafness to high frequencies was a common malady among workers riveting the steel plates used in constructing locomotive boilers. It became known as boiler maker's ear.

Today, everyone runs the risk of impaired hearing. For noise levels are far higher than they were a century ago.

From the time he leaves the breakfast table to the accompaniment of the radio, the dishwasher and the hum of the refrigerator, he drives to work to the sound of horns and heavy construction machinery. The modern man seldom has a peaceful moment. Seated in his office, he works to the hum of the air conditioning, the mechanical rattle of the typewriter and the ticking accounting machine. And so it goes on.

On the average, these are conditions we must live with. But long periods of excessive noise may destroy fine nerve fibres in the inner ear, resulting in permanent hearing damage.

Of course, there were loud noises before the industrial revolution. In 1782, Admiral Lord Rodney was described as being totally deaf for 14 days after the firing of 10 broadsides from his ship, HMS Invincible. And an officer was reported permanently deaf from the firing of cannon in the battle of Copenhagen.

According to experts, noises that cause discomfort or seem unbearable may, in fact, be harmful. Several years ago, the construction industry started a hard hat campaign for safety. Old-timers were reluctant to seek protection but statistics showed that hard hats were a precautionary measure that paid off in saving workers from bad head injuries. Now the Ontario Medical Association has tabled recommendations that may prove equally effective in protecting workers from hearing damage.

A committee recommended minimum





noise levels for Ontario industry based on standards developed by the Defence Research Medical Laboratories and used by the Canadian Armed Forces.

Sound is measured in two ways. Its intensity is measured in decibels and its pitch in cycles per second. (We generally find loud and high-pitched sounds more annoying than soft low-pitched ones.) These decibel levels mean little unless the frequency of the sound is also considered.

Criteria used by the Canadian Armed Forces suggest that workers in an 85-100 decibel environment should be exposed to this noise level for only four hours a day. They should wear ear plugs or ear-muff protectors if exposed to levels above 100 decibels for more than 15 to 20 minutes. Over 150 decibels, whole body protection may be required.

"But one of our biggest problems is getting employees to wear ear protectors," says Dr. D. K. Grant, head of Ontario Hydro's medical division.

Acoustics experts have found harmful noise levels occur in rock music. James A. Flugrath, of Memphis State University, Tennessee, recorded 10 rock groups. He found the noise level potentially damaging to the hearing, averaging about 105 decibels over a three-hour period. At these levels, the kids should have been wearing ear plugs.

Hearing becomes feeling around 115 decibels and may produce ringing in the ears. A car horn, 23 feet away, could measure 100 decibels on the average, a noisy factory about 90, an average factory about 70, average conversation about 50. A whisper four feet away might register 20 decibels, the rustle of leaves in a silent wood 10 decibels.

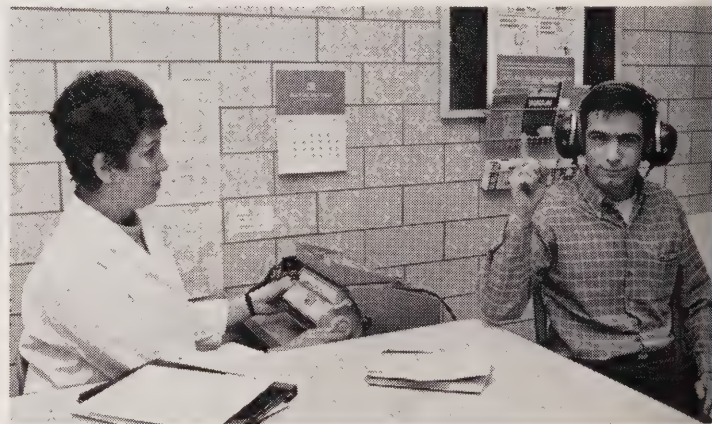
The Canadian public appears to be slow in taking action against noise. Strangely enough, the commonest complaint seems to be the barking dog. Complaints are more numerous in summer months when

windows are thrown open. Construction noise is another leading source of annoyance that is reported.

One of the earliest crusaders on the North American continent was Mrs. Julie Rice, of New York City. She claimed that tug-boats tooting on the Hudson River interfered with her sleep. She won a lawsuit against the tug-boat company. In 1904, she founded the Society for the

levels can cause fatigue, irritability and headaches, which in time lead to mistakes and a general falling off in efficiency," says Dr. Tom Hamilton, of Hydro's medical division.

Deafness due to noise affects both ears and usually results in an inability to hear tones an octave higher than the noise which caused the impairment. The condition is most significant when the deafness is to



Suppression of Unnecessary Noise, which later became the National Noise Abatement Council.

Britain formed its Noise Abatement League in 1933 under the leadership of the late Lord Horder, physician to the Royal Family.

Ontario Hydro has adopted a three-pronged approach to the problem of noise in the work environment. Firstly, attention is paid to plant design to try to make equipment less noisy; secondly, operating procedures are arranged so that, where possible, employees spend a minimum of time in noisy surroundings and, thirdly, operators are provided with sound-excluding devices such as earmuffs, earplugs and screened-off areas.

"There's no doubt that excessive noise

sounds in the 2,000 to 4,000 cycles per second range, which encompasses normal conversation.

Three major contributory factors to deafness are aging, ear infections and noise. All employees at Hydro's Lakeview and Huron plants are being screened at work by nurses trained in the use of audiometers.

Of the 320 employees checked to date none has been found to have hearing damage which can be directly attributed to noise exposure at these plants (ear infections in earlier life have accounted for most of the abnormal audiograms). Damage to hearing occurs only after continuous long-term exposure to high noise levels and frequencies and the aim is to prevent such exposure.

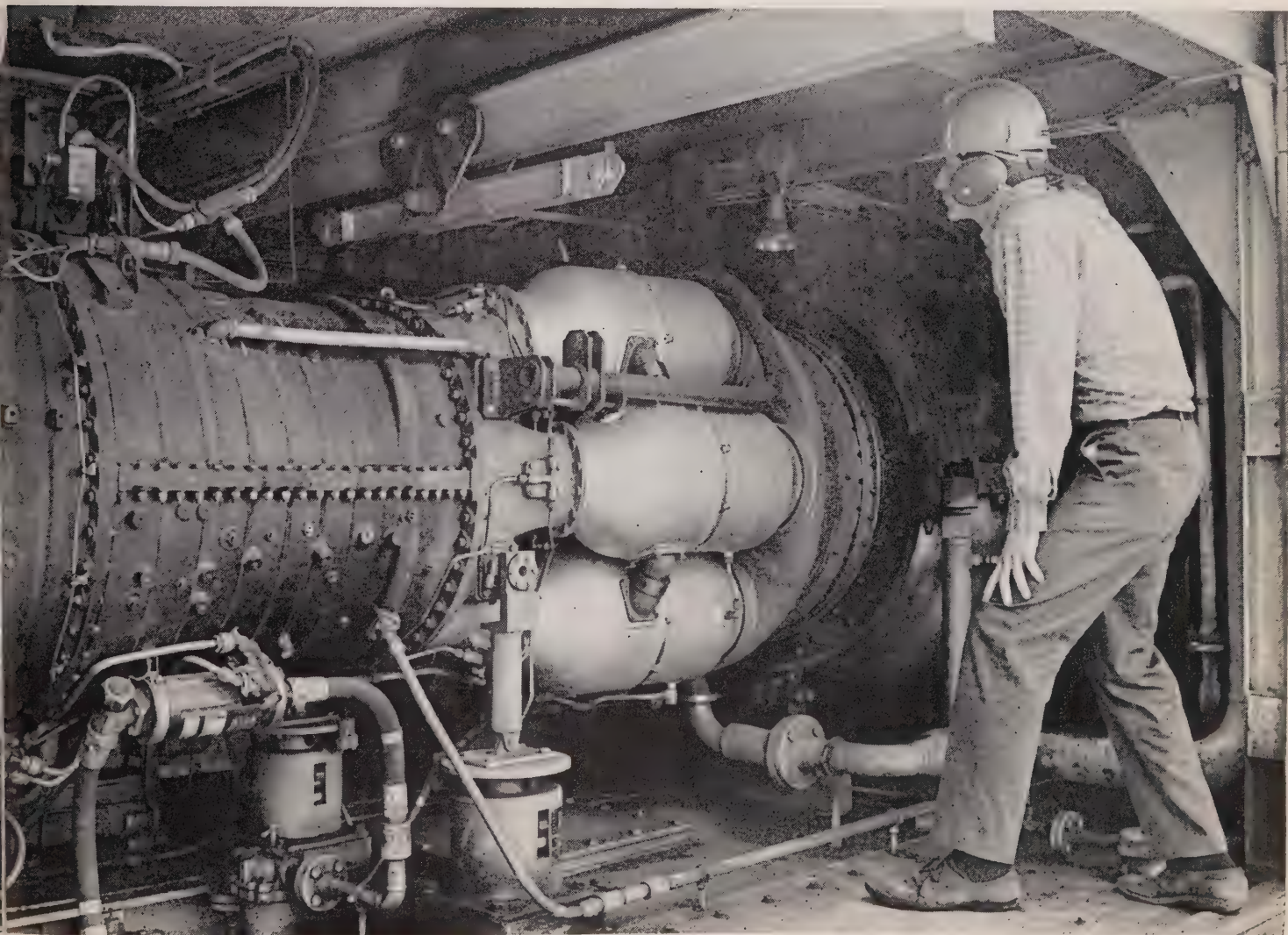


hoped to check new employees before  
y begin work in these plants, re-  
mine them at intervals and extend the  
gram to other work locations. Liquid-  
d earmuffs of National Research  
uncil design are available in noisy areas.  
ustics engineers realize that man-made  
se cannot continue increasing at its  
ent rate. "If it does, the experience  
noise drowning out normal conversation

will be an everyday event within two or  
three decades," says Aubrey Edwards, an  
Ontario Hydro research engineer.

Mr. Edwards is a noise and vibrations  
specialist. His department plays a varied  
role in attempting to keep the noise level  
of office buildings and generating plants  
within acceptable limits. Anti-noise  
measures Hydro is pursuing include  
baffling the hum from transformers and

*Ontario Hydro trainee operator Jerry Moriarity  
raises hand as soon as he hears sound during  
audiometer test. Below, he wears earmuffs  
during inspection of a noisy combustion  
turbine generator.*





many other types of equipment used in Hydro's generating stations and offices.

At the moment, Mr. Edwards and his team are carrying out tests on heat pump equipment that may eventually be sold to the homeowner. To date, most of the equipment tested has proved far too noisy.

Hydro carries out testing in an anechoic chamber — a specially built room that cuts down the reverberation of sound to a minimum and enables highly sophisticated testing equipment to pinpoint where machinery or equipment noise is originating. Ontario Hydro and the National Research Council in Ottawa are among the few centres in North America with such an installation.

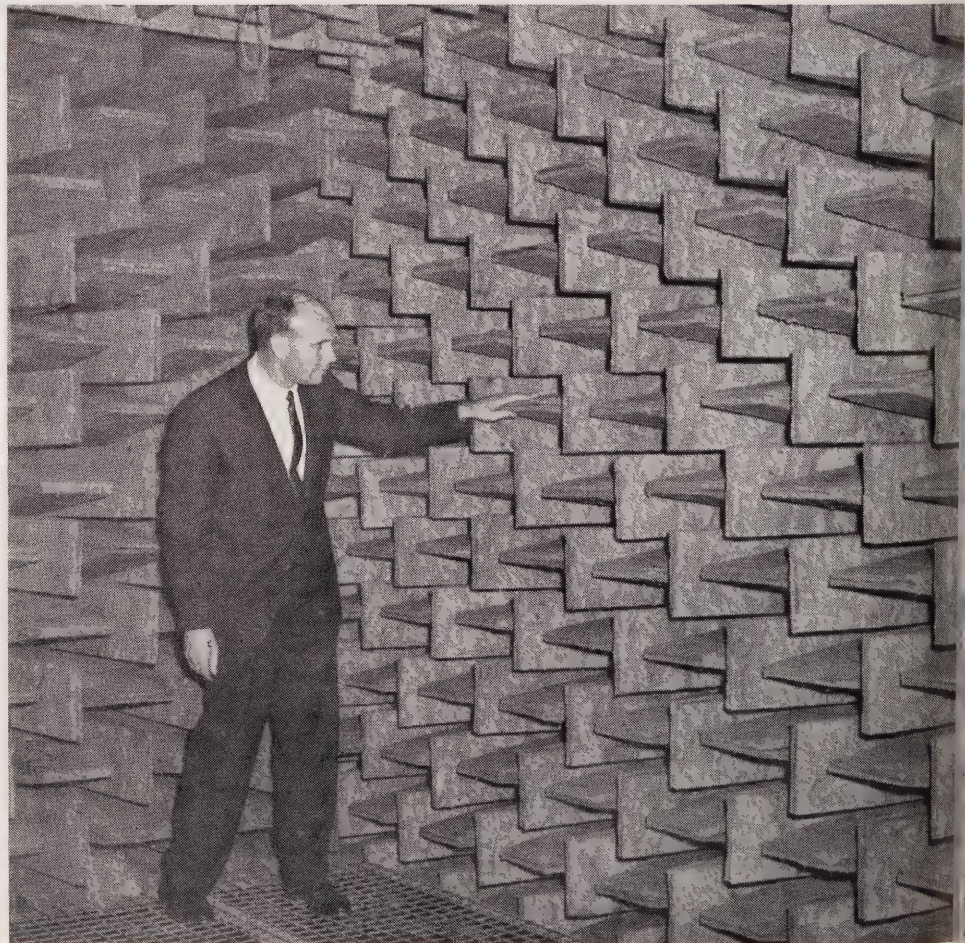
Some of the chief noise offenders have been created by man's desire for faster transportation. Jet aircraft noise, in particular, and the up-coming Concorde supersonic airliner have aroused considerable controversy.

Future airliners flying faster than sound may create at ground level a noise volume of 130 decibels across a 25-mile wide path. Hopefully, they will be travelling over the ocean when flying at this speed. Both Britain and the United States have conducted sonic boom tests to try to assess the effects on both people and buildings.

In the future, noise levels will be as important as proper heating and lighting. Acoustic design will play a far greater part in the construction of buildings; partitions in offices to prevent noise from disturbing other workers will be far more common. Canada, the United States, Russia and Britain have already established noise limits for workers.

The emphasis appears to be in making the world, if not the best place to live, at least the quietest possible. □

*Readings on noise levels are frequently taken at Hydro installations. Below, research engineer Aubrey Edwards checks anechoic chamber, a test room for studying equipment noise.*

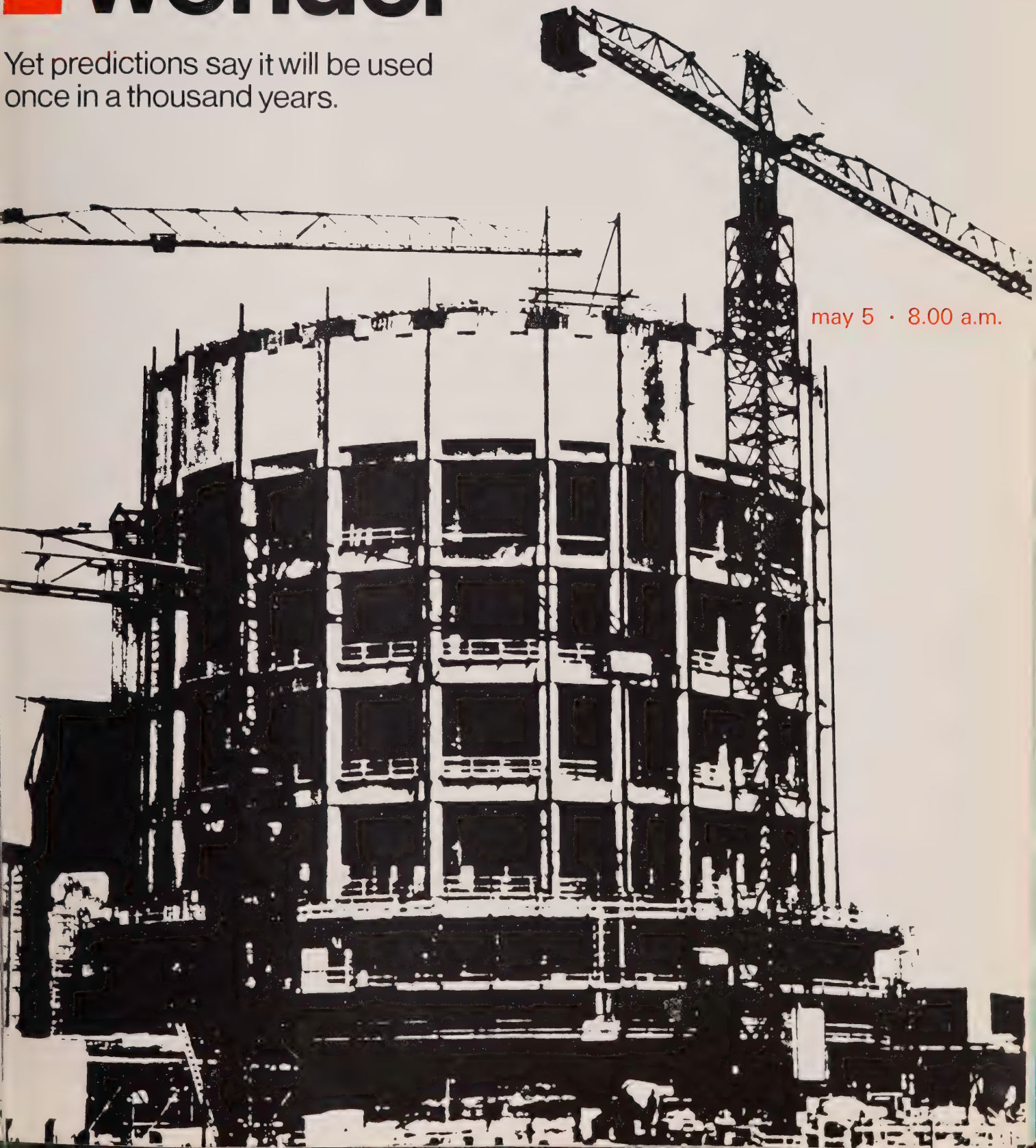




# 7 day wonder

Yet predictions say it will be used  
once in a thousand years.

may 5 • 8.00 a.m.

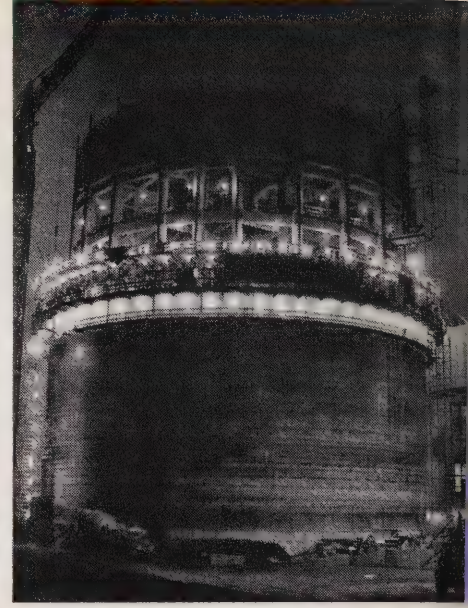
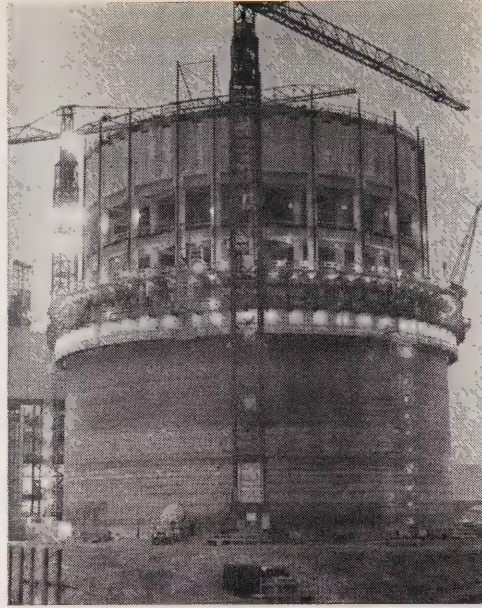
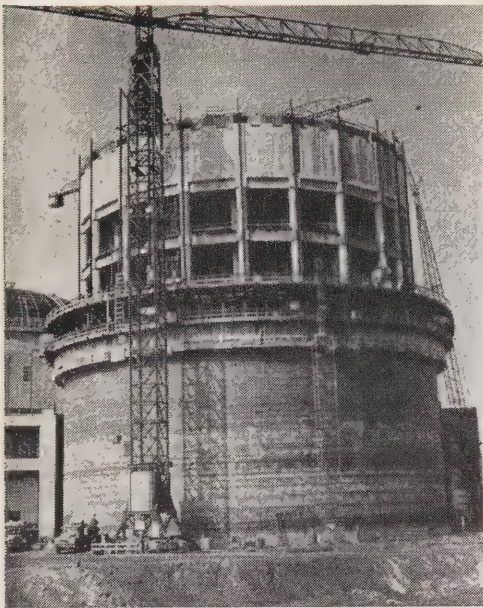




may 8 • 3.45 p.m.

may 8 • 8.55 p.m.

may 8 • 10.25 p.m.



Seven and a half days. That's all it took construction crews working around the clock to encase the 159-foot high vacuum building at Ontario Hydro's Pickering nuclear power station near Toronto in a three-foot thick wall of reinforced concrete.

Seven and a half days and 15 months' planning. And to crown it all, the building may never be used.

The vacuum building is, in effect, a huge safety valve. Together with the station's pressure relief system, it is designed to contain all the radioactive material released in the unlikely event of an accident involving the nuclear reactor or heat transport system.

"The building is only one of several safety devices," says reactor safeguards engineer Ray Kelly. "It will be used if all other devices fail at the same time. On this basis, we

calculate the need for the vacuum building will occur at a rate equivalent to once in a thousand years."

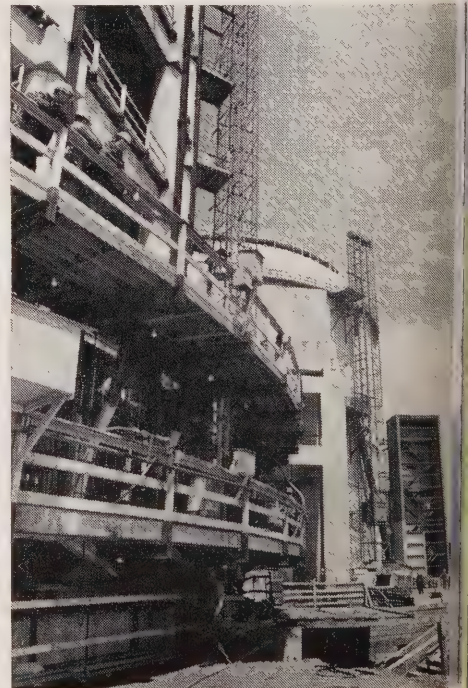
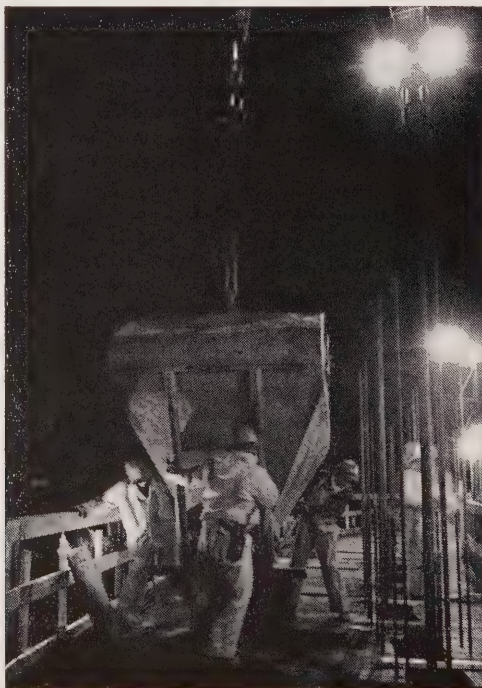
Pressure in the vacuum building will be maintained at one pound per square inch compared with normal atmospheric pressure of 14.7 pounds. This pressure differential means that any escaping radioactive material would flow into the vacuum building rather than leak into the atmosphere. The whole process would take perhaps 15 seconds.

The building, which is 530 feet in cir-

cumference, was encased by a process known as slip forming – the continuous placing of concrete in a rising structure. The operation was planned down to the minutest detail.

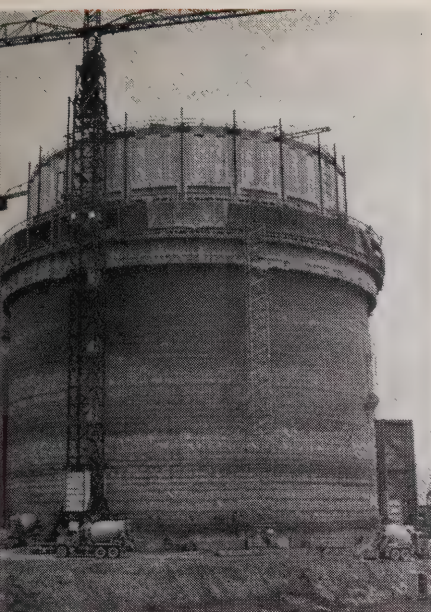
One hundred and fifty men, working in two 12-hour shifts, were assigned to the job. A dispatcher controlled the movement of concrete trucks from a plant in nearby Ajax. Production of 120 yards of concrete an hour was arranged, with a standby capacity of a further 40 yards an hour. In all, the three-foot thick wall took over 9,000 yards of concrete of a special mix

*Night and day the big pour continued. Top photos show the concrete envelope rising in successive stages.*

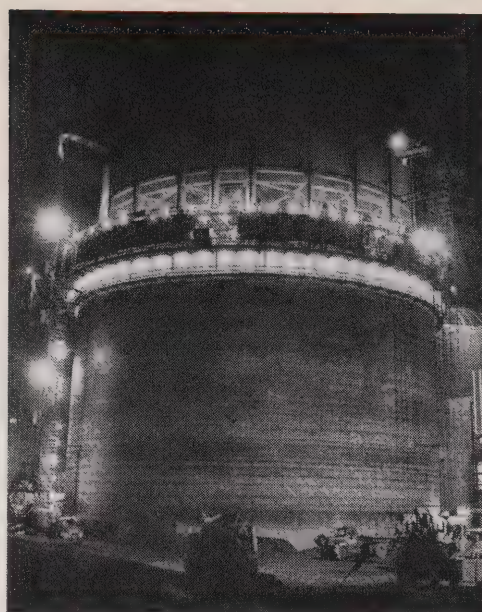




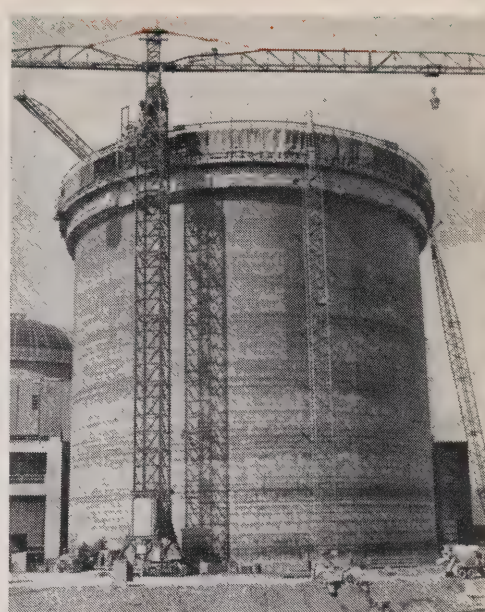
July 10 • 4.30 p.m.



May 10 • 10.00 p.m.



May 12 • 5.00 p.m.



controlled temperatures and 950 tons of reinforcing steel. Tolerances had to be maintained to within a half-inch.

The working decks were installed around the structure and rose with the wall. Twenty-four hydraulic jacks were used to move the forms and the entire system was capable of "cycling" in three minutes. The jacks were kept level to a half-inch tolerance to avoid jamming the forms. For the same reason, spilled concrete was promptly swept away.

Workers working on the decks were in

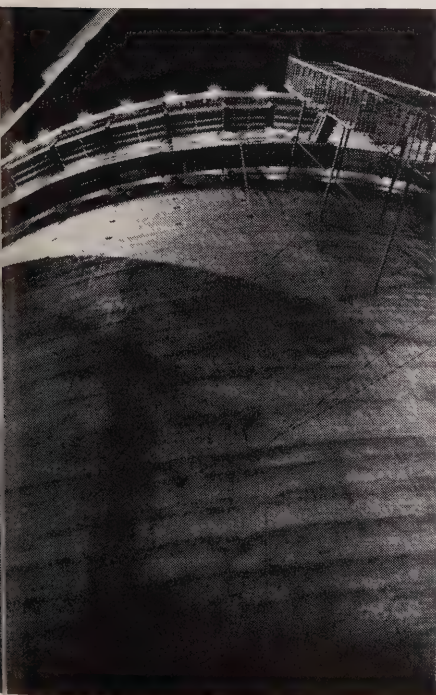
constant touch with the ground and the concrete mixing plant by two-way radio and telephones.

In spite of high winds and rain, the job was accomplished about two days ahead of schedule. "We planned on raising the structure nine inches an hour and we actually averaged eleven," concrete supervisor Stan Fisher said later.

"Everything went beautifully. All the suppliers did an excellent job — we never ran out of material — and the entire operation ran very smoothly," he added.

The vacuum building is supported by about 1,000 steel piles driven to bedrock. It has 61 interior concrete columns and is roofed with a two-foot slab of reinforced concrete. It will be connected to the four reactor buildings by a reinforced concrete pressure-relief duct about 20 feet wide and 25 feet high.

Atomic Energy of Canada Ltd. designed the building specifically for Pickering, which is due to produce first power in 1971. The \$570 million station will have a capacity of 2,160,000 kilowatts when completed in 1973. □











# che-mun country

story and photos by Nick Nickels

You can tell a true Kawarthan by his lifetime usage of two singular words that naturally have to do with this picturesque lakes region of Southern Ontario.

He never calls the maskinonge — that plucky fighting fish and tourist trademark — anything but "lunge." And he never, never refers to a canoe as a "boat."

Lunge is short for muskellunge, a colloquialism for the fish whose name has as many as 14 different spellings. But the Kawarthan canoe is a precise, formal thing inherited from a millennium of canoe building and usage.

Trent University anthropologists say that canoes of sorts were used in the Kawarthas by the earliest Indian people. The later Ojibwa Indians named one of the popular lakes in the region Che-mun (meaning canoe) for its original source of canoe-building birch barks. The name has been anglicized to Chemong.

Explorer Samuel de Champlain was the first white traveller in the Kawarthas to record transportation by canoe, in describing his trips with Huron war parties in 1615. And to this day, the region still produces fine hand-crafted canoes.

For instance, there's Mel Hunter and George Stenner, two Lakefield master builders with a combined know-how of 82 years. Between them, they turn out about half a dozen cedar strip canoes a year. Production goes to canoe buffs who cherish their meticulous handiwork and there's always a backlog of orders. But it's time-consuming work.

Mr. Hunter owns Juniper Island Marina at Stony Lake and a small winter shop near Lakefield. Mr. Stenner helps him. Boat repairs, maintenance and storage and the construction of outboard fisherman-type boats earn the two builders their bread and butter. Canoe-building is almost a sideline.

However, the two men dream of someday concentrating on canoe-building alone. If they do, they vow not to succumb to production-line methods and shortcuts,

maintaining their high standard of craftsmanship on possibly 100 canoes annually.

High standards are costly. From the searching out of suitable raw materials to the application of the last mirror-like coat of varnish, time is more precious than materials. This is reflected in the current \$350 price tag.

When good Kawarthan canoes sold a century ago for \$75 or less they were made from butternut, redwood, basswood, mahogany and always of Ontario white cedar. Today only the cedar is available. And that in limited tree sizes that must be ferreted from the lumber piles of small country sawmills within 100 miles of Lakefield.

Red and white oak, white ash and elm are easier to come by while British Columbia cedar, mahogany, spruce and fir can be purchased from importing lumber firms. All local wood is yard dried for one year before it is ripped and planed to required stock sizes.

Handmade canoes are built over wooden moulds of time-tested design. From the one and only Lakefield canoe mould, salvaged from a former freelance builder's shop, comes a craft 12 inches deep and 16 feet long with a 33-inch beam. It weighs 70 pounds.

First, the keel and the bow and stern stems are laid over the mould. Then the 74 half-round elm ribs, boiled to pliancy for one hour, are set in place to give the hull its shape. The narrow cedar strip planking, rabbeted on both edges, is fastened to the ribs with copper nails, each inserted into a hand-drilled nail hole. The 3,500 nails are then clinched on the inside of the hull.

In progression the oak gunwales, thwarts and the bow and stern snouts and the spruce decks are shaped, sanded and installed. The outside of the hull is sanded; the inside of the planking strips were sanded before being nailed in place.

If the building is a long process, so is the finishing of the Lakefield canoe. The hull



*Craftsmen George Stenner (with power drill) and Mel Hunter build cedar strip canoes near Lakefield. Mould for their 70-pound craft is seen top left. Other photos show the attachment of cleats to hold the bottom boards and planing, varnishing and loading operations. Mr. Hunter is holding a model of the Lakefield canoe.*







*Flashback to 1959 when Algonquin Indian Matthew Bernard, left, then 85, built replica of a birch bark freight canoe. The canoe, shown in the lower photo, is now in the National Museum in Ottawa. Note use of crooked maple mallet. Golden Lake Indian Reserve still manufactures genuine birch bark craft.*

soaked for three weeks with three  
lons of boiled linseed oil that saturates  
the wood. The hull is allowed  
dry until no oil smear can be  
rubbed off by touch. Oiling prevents  
the wood from cracking and assures water  
tightness for the lifetime of the canoe.

Varnishing is the final important step.  
Only imported varnish containing no  
plastic base is used — three coats applied  
by hand with ample drying time and  
sanding between each.

The finished Lakefield canoe is a thing  
of beauty to behold ashore and a sensitive,  
responsive craft afloat to the expert  
pilot. He will care for it for a lifetime  
and would a millionaire his Rolls-Royce.

In contrast to the shop-built methods of  
the Lakefield canoe is the bush building  
of the genuine birch bark craft at Golden  
Lake Indian Reserve in the upper Ottawa  
River Valley.

The operation which provides an ideal  
opportunity to study aboriginal building  
methods and the use of raw materials:  
the gathering of the grey canoe bark; the  
fitting of white cedar logs for ribs,  
the thwart and gunwale stock;  
the digging for white spruce rootlets used  
in lacing together the bark "bag" and  
the application of hot spruce pitch and  
mixture, the caulking compound  
for the seams. Methods and materials  
have not changed from the conception  
of the canoe.

A building mould is used for the Indian  
canoe. Instead, stakes driven in the ground  
mark the perimeter of the hull and pliable  
sheets of soaked bark are draped inside  
the stakes to shape the hull. Final shaping  
and substance are given by thin cedar  
strips inserted lengthwise between the  
ribs and bark cover.

The Indian canoe-building tool has  
remained unchanged since historic times  
— a small pull-to-you drawknife called  
a mani-go-tagan, or crooked knife.  
This versatile tool from the early 1800s  
helped build the great fleets at Lachine  
on the Lakehead and the small northern  
fleets of the hinterlands.







*Steps in the construction of a birch bark canoe show cedar slats being shaped with the mani-go-tagan knife, white spruce rootlets that are soaked in water before being quartered to make "thread" for lacing the hull and rolls of bark that are stripped from the trees in June.*

The craft that once carried the commerce of Canada across the continent were built by the thousands. Yet so perishable were they that not one was preserved. However, master builder Matthew Bernard built a freighter replica at Golden Lake in 1959, at the age of 85. And his sons and grandsons carry on the tradition on smaller sizes. The big canoe was ignominiously trucked to the National Museum in Ottawa instead of being paddled down the old river fur route.

Undoubtedly, canoeing as a pastime is on the upsurge. Post-war European-Canadians, keen canoeists themselves, are partly responsible for the revival. And established cottagers are launching old craft that were relegated to the boathouse rafters by the surge of power boating.

"Scientists, engineers and professional men are turning to canoeing for recreation. They find it relaxing, enjoy the exercise and seek quieter surroundings," says Doug Mortimer, co-owner of a large marine retail complex in Peterborough. "The speed and distraction of outboarding has begun to pall on many uptight groups of business people. Canoeing has become an antidote."

Especially wilderness area canoeing. The Ontario Department of Lands and Forests has long fostered this form of recreation in Quetico and Algonquin provincial parks. Such is the demand elsewhere that crown lands on water routes are being reserved in part for wilderness canoe campers.

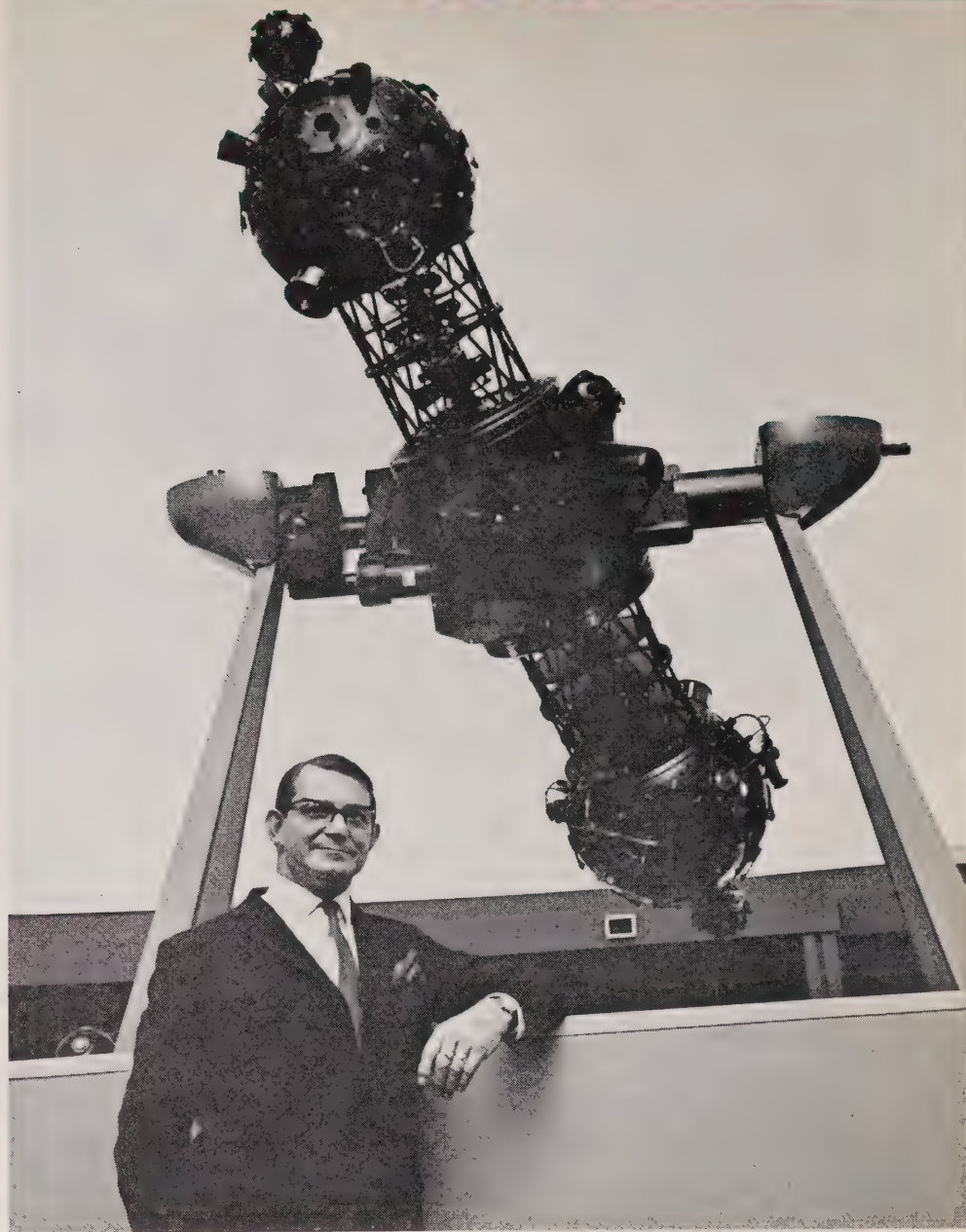
The latest government-designated area, ready for use this summer in the northern Kawarthas, is but two hours' drive from Toronto. The six Kawarthan routes are described in detail by the forestry district headquarters, Lindsay. Other routes have been laid out in the Haliburton region and in tributaries of the Trent system. □





*Dr. Henry C. King, curator of the McLaughlin Planetarium, stands beside the 2½-ton instrument that projects the night sky on the planetarium dome.*

# the time machine



After the moon, the planets. NASA administrator Thomas Paine declared after the successful flight of Apollo X that the common aim of the US space program was to achieve a Mars landing in the 1980s.

Man is about to burst from his earth-bound environment. Yet for many years, maybe centuries, space travel will be restricted to the privileged few. As for the rest of us, we'll have to settle for it second-hand through the medium of TV. But there is another way to explore the wonders and the vastness of the heavens. For the planetarium, a micro-universe, knows no boundaries of time and space.

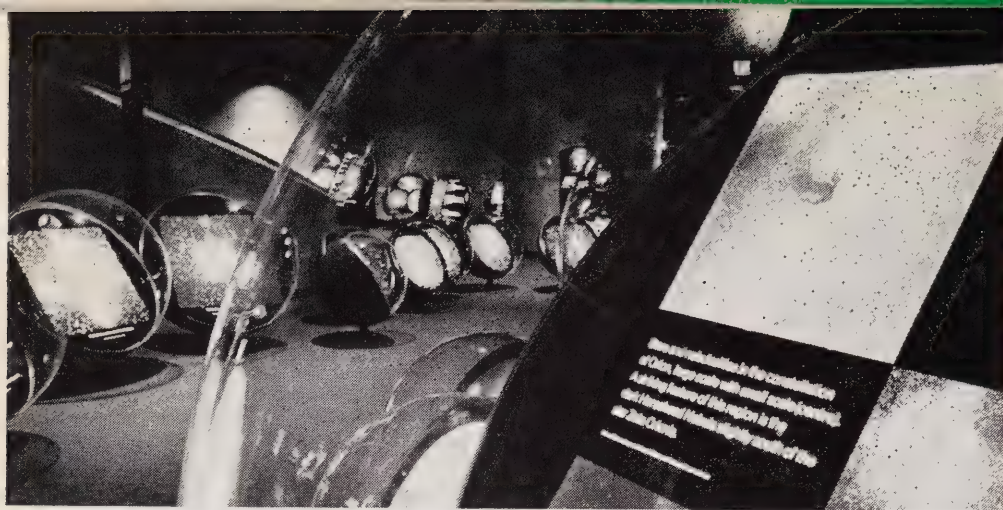
Canada has half a dozen such theatres of the stars. The newest, the \$2,250,000 McLaughlin Planetarium, was opened in

Toronto last fall. And as though reflecting the technology that made possible the conquest of outer space, the projection equipment itself is a masterpiece of electrical and optical engineering.

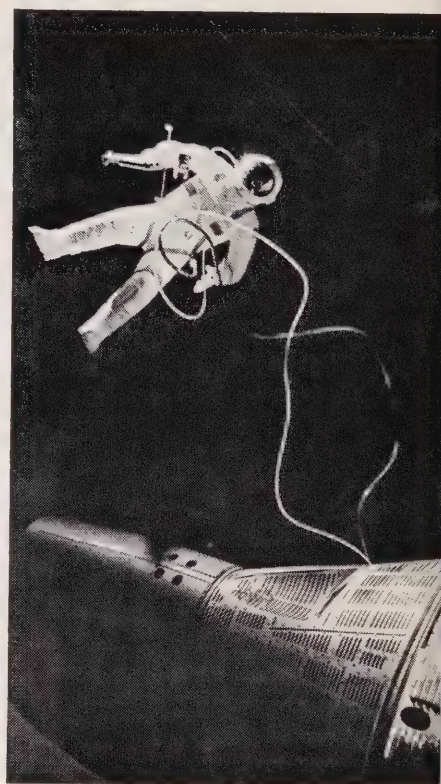
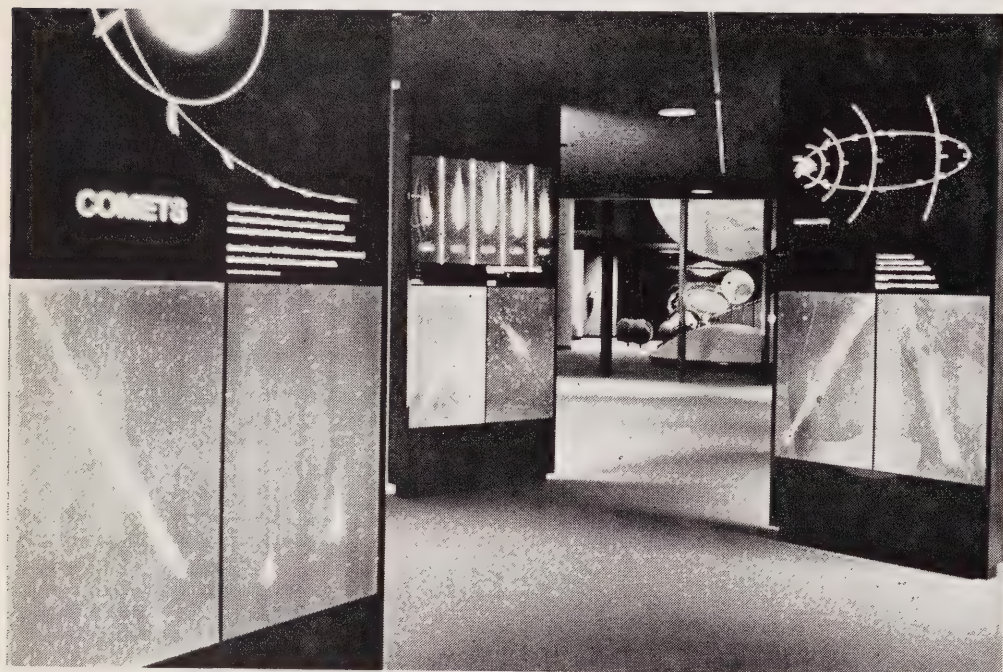
The McLaughlin Planetarium's dumb-bell shaped 16-foot high projection instrument can show 8,900 stars – some 4,500 at any one time – on the building's dome-like screen. One hundred and twenty linked projectors produce star formations, the Milky Way, the sun, moon and planets. Illumination is provided by two 1,500-watt lamps.

Four electric motors move the 2½-ton machine smoothly and soundlessly to produce motion representing the daily revolution of the earth, changes in terrestrial latitude, the precession of the





*Astronomical displays prepare planetarium visitors for the actual show. One display re-creates the space walk of astronaut Edward White.*



equinoxes (the 26,000-year wobble of the earth as it rotates on its axis) and a vertical-axis motion creating the apparent movement of the starry sky as seen from a spacecraft. Nearly 30 additional motors are used in the production of other effects. Time means little in the planetarium and the entire precessional cycle can be compressed into one and a half minutes.

The planetarium stars are actually the images of tiny holes punched in thin copper foil. The foil is then sandwiched between glass plates to form what is known as a star field plate. There are 16 star fields, each with its own projection lens. In addition, 23 of the brightest stars are formed by individual projectors.

Four projectors are used to form the planetarium sun. Two produce the sun's disk and two form a halo of diffused light around the sun. All movements and

changes are controlled remotely from the lecturer's console.

The aluminum sheets of the projection dome are perforated with tiny holes too small to interfere with even the smallest star images. Their function is to reduce echo effects by allowing sound waves to pass into the space between the projection dome and the building's outer dome, where they are absorbed by baffles. The millions of tiny holes also play an important part in the ventilation of the theatre.

Cool or hot air is ducted into the theatre as the computer-controlled environment requires. Careful filtering of dust particles ensures that light beams from the projectors to the dome remain invisible. Since the opening of the McLaughlin Planetarium last October, more than 200,000 visitors have viewed the universe from the armchair comfort of the theatre. □



# ready mixture of mortarboards, hard hats and grey flannel suits was brewed on the campus of Queen's University for this year's AMEU summer conference. It provided delegates with an educated look at the future. Fittingly enough, the conference was entitled... **beyond the blue horizon**

the opening of the conference, Dr. J. M. Hambley, Ontario Hydro's general manager, took a peek into the future. But not before warning delegates a word of caution.

"Forecasting future events is something we usually try to avoid because experience has taught me that Harold Smith (Hydro's chief engineer) knows whereof he speaks when he says, as he does frequently, that the only certain thing about a forecast is that it will be inaccurate."

Dr. Hambley said that probably some of the greatest adjustments in the AMEU would arise out of the trend to regional government. It would inevitably reduce the number of municipal utilities — "and this, of course, will mean fewer managers." On the other hand, it also meant an upgrading of managerial competence as small utilities amalgamated to form larger units and thereby put more demands on management people.

"This, I suggest, will react to the benefit rather than detriment of the association."

Dr. Hambley urged delegates to keep abreast of the knowledge explosion, pointing out that exploitation of technology was one of the few weapons managerial people have in the war against inflationary pressures. He observed that time spent by everyone, from the office boy up, in study

and retraining will take an ever-increasing portion of the time available. Management people who refused to recognize and meet this challenge would be doing a disservice to their organizations.

Looking at a typical company organization, Dr. Hambley said that the pyramid with a broad base of unskilled people tapering upward through diminishing layers of higher skills to a single top executive would change. It would be replaced with an organization with a much narrower base of the unskilled, a greatly expanded central core of skills including more people with some post-secondary education and topped by a committee-type executive.

"The individual problems to be faced by the municipal utilities and Ontario Hydro will increase in both magnitude and complexity," Dr. Hambley said, mentioning technical and engineering developments, marketing, capital funds and labor as examples.

"Meeting these will require co-ordinated and integrated planning between Ontario Hydro and the municipal utilities in ever-increasing measure, and the AMEU will be called upon, more and more, to express the collective managerial and technical opinions of its members." □

## the economic triangle

Speckling his observations with humor, Professor C. A. Lawrence, of the Queen's University commerce department, took AMEU delegates on a stroll through the balance of this century in his talk, "Changing Markets."

Professor Lawrence likened a company's affairs to a triangle. The three corners represented capacity, opportunity and effort. Under capacity were men, money and the organization itself. Under opportunity were such limiting or expanding factors as government, competitors, and consumers. And under effort came the product, price and distribution.

"Business decisions are made from the wants and needs of the market," said Professor Lawrence. "The way for a firm to go broke in a hurry is to tell consumers what they want."

It somewhat reminded him, he said, of a Canadian Prime Minister of years past who operated on the principle of "show me where the people are going and I'll lead them there."

He said that it was impossible to stop a trend — "it can't be legislated to a stop, only slowed down."

Markets, he said, weren't people, or all the



*Talking prior to the opening of the conference are Ron Mathieson, AMEU manager; Dr. J. M. Hambley, Ontario Hydro general manager; Dr. John Deutsch, Queen's University principal and Jack Anderson, AMEU president.*



businesses would be packing up and going to India or China. Markets were people with money which they were willing to spend on items they needed or thought they needed.

Basing his figures on a yearly price rise of two to five per cent, the professor said there would be a tremendous jump in the country's gross national product. He said that in 1955 it was \$27 billion and in 1965 it was \$51.5. But by 1975 it would have more than doubled to \$112 billion.

Population, on the other hand, would have grown at a smaller rate — from 15.6 million in 1955 to 24.3 million in 1975.

"Obviously, wages are going to rise, working hours are going to shorten and retirement will be at an earlier age. People will need to consume more if the GNP is to go up, and it will with more leisure time at their disposal — golf clubs, boats, books, travel."

Some large companies were retiring workers at 50 and 55, and this would soon be the rule, not the exception. He also noted the substantial wage increases gained recently in the auto and construction industries.

Professor Lawrence pointed out that the market will be a "younger" one, since the average age of the population is dropping — already half of all Canadians are under 25 years of age. He told delegates he was willing to bet that the dropping birth rate would be rising again in the 1970s after a marriage boom, giving more impetus to the falling average age.

"People are going to be spenders, they're looking for a style of life. The present nine per cent savings rate will go down. Money will be spent in different ways."

He also predicted a continuing migration to the dozen large metropolitan areas across Canada — as much as 80 per cent of the

population could be urban in the next decade.

"They'll be clustering in the large cities because that's where things get done, that's where the action is," he explained.

Referring back to the fall in the average age and its problems, Professor Lawrence said there had always been a generation gap. "I never understood my father, he never understood me and his father never understood him.

"We all grow up with different surroundings and are molded in different ways. I grew sideburns and my wife said 'get your hair cut.' My students told me I looked great."

## trend to bigger units

Even bigger generating units are in store if efficiency is to be increased and costs held down.

This was the gist of a paper presented by Henri Teekman, Ontario Hydro resources planning engineer. With the aid of slides and graphs, Mr. Teekman showed delegates that thermal-electric units, particularly nuclear ones, only get economically attractive when their capacity is in the hundreds of thousands of kilowatts.

"Ideally, of course, the source of power should be as close to the load as possible — right in the basement," said Mr. Teekman. However, examination by his department had shown that the capital and operating costs of such small power units were too high.

Mr. Teekman said that the possibility of locating smaller thermal power stations near small loads across the province had also been investigated, and found wanting. Aside from the higher per kilowatt costs,

there would be problems of fuel delivery, cooling water sources and staffing. Fuel for such stations would likely have to be hauled by truck or rail — much more costly than delivery by ship as is now possible with Ontario Hydro's giant plants on the Great Lakes system.

He said that Hydro is barely able to employ enough trained workers for its large plants near large centres, and that a proliferation of small stations would compound the problem.

Mr. Teekman told delegates that since Hydro moved into the thermal-electric field, the size of units had increased. The largest coal-fired units were the 575,000-kilowatt generators planned for the Lennox station near Kingston; the latest nuclear units are the 800,000-kilowatt generators to be installed at the Bruce station, near Kincardine.

Mr. Teekman said that for plants to be brought into service by 1980, his group would be looking in the 750,000 to 800,000-kilowatt range for conventional units and in the 1,000,000 to 1,100,000 kilowatt range for nuclear units.

## imagination limits technology

"We are no longer just the telephone company, enabling two people at either end to have a voice path to talk to one another," said Jack V. Hassell, a Bell Canada assistant chief engineer. And then he described the far-reaching activities of his company, with particular emphasis on the future.

He said that in this day of rapid scientific and technological advancement, "one is limited more by a lack of imagination on the part of people like Buck Rogers kind than by a deficiency





specific knowledge or technical devices." Mr. Hassell split his remarks into three sections covering Bell's transmission network, central switching equipment and instruments used by subscribers. Terming the transmission network "our single most important resource", he talked of the 10-year-old microwave system which has been beefed up from its original 2,400 voice channels to 12,000.

Of coaxial cable, the engineer said Bell Canada is installing a more rugged cable, which can be plowed directly into the ground rather than laid in a trench. One mile of this type in use in the US has 20 lines and can carry 32,400 voice circuits. Another under development carries 90,000 voice messages.

Of wave guide system, said Mr. Hassell, equipped with solid state electronic components, will come into commercial use in the early 70s and will be able to carry 10,000 voices.

A second development is the laser, which is in current use in metallurgical and surgical procedures. But much developmental work has still to be done to produce commercially viable communication systems with lasers and it is anticipated that it will be at least 10 years before a working system will be available. From the standpoint of capacity, the laser system is extremely active, since the frequency bandwidth of the modulated light beam can theoretically provide up to 10,000,000 telephone data circuits, or 5,000 television channels," he explained.

Next, Mr. Hassell spoke of a telecommunications satellite that would be "parked" 22,300 miles out in space, moving in a geosynchronous orbit with the earth's surface. Messages would be beamed up and down to the earth through ground stations for

long-distance transmission. Present planning for a Canadian satellite calls for a six-channel device with a capacity of 2,000 circuits.

Turning to switching equipment, he traced its history from early dial equipment to electronic systems. The first of these was installed in Montreal for Expo 67, and a second in Toronto the following year.

"Unlike electro-mechanical switching equipment, the ESS office with its computerized brain and body of solid state electronic components has relatively few moving parts. Maintenance costs are thus considerably reduced. The equipment is compact and requires only 30 per cent of the floor space of its predecessor to process an equivalent number of calls," he said.

Of telephone instruments themselves, he said they had evolved into a Canadian designed and manufactured telephone with a dial or push buttons mounted in the handset. "The combined usage of the touch tone set as a data input device and the picture-phone as an instantaneous display device for information retrieval from computerized information banks should prove to be of significant value," he added. □

## the rising cost of carelessness

J. L. Tron, outgoing president of the Electrical Utilities Safety Association, said that EUSA also stands for "Employ Ultimate Safe Approach."

"This is what the association is all about," he said, "and this is the slogan that I would like to see our group adopt and use as its permanent motto."

In his report, he traced the happenings of

the past year, paying special attention to a questionnaire sent out last November. Mr. Tron said that the response showed that members in EUSA unanimously supported the association and the part it is playing in the electrical industry.

Telling delegates they were not obliged to adopt any of the safety rules contained in EUSA's rule book, he drew their attention to a section of the Workmen's Compensation Act, which says that an employer can be charged if he neglects to take proper precautions for worker safety.

Mr. Tron outlined a recent change in the Act that provides for increased assessment of an employer from the compensation board. This is done when the work injury frequency and the accidental cost of the employer are consistently higher than that of the average for his industry.

"This section of the Act has really put teeth in it — they can penalize an employer and impose heavy penalties. An example of this occurred recently, so be well advised — take precautions and avoid the risk of having penalties imposed," said the president.

Three meritorious action awards were noted. The recipients saved a life as a result of their quick efforts. In addition, five meritorious service awards were made to former EUSA presidents and directors of long standing.

Elected to head the association were: W. R. Pfaff, St. Catharines, president; W. M. Hogg, Sault Ste. Marie, vice-president. Directors: C. I. Bacon, Cornwall; J. K. Fee, Kingston; N. A. Grandfield, Brantford; B. G. Kirstine, Toronto; H. W. Little, Brockville; K. L. Miller, Dunnville; E. Ounpuu, Fort William; C. S. Phelps, Sarnia; W. H. Powell, Peterborough; H. J. Schmidt, Parry Sound; D. M. Seath, Stratford; J. A. Torrance, Etobicoke and J. L. Tron, Pembroke. □



*A coffee break outside the session hall provided an opportunity for exchanging ideas. Left: Lt. Col. A. A. Kennedy, Ontario Hydro commissioner; W. E. Theaker, Paisley; W. H. Weber, Baden; E. D. Elwes, Paisley and Harold Firth, Canadian General Electric. Right: Stan Beesley, Canadian Westinghouse; Bev Gill, Etobicoke; R. W. Brown, Etobicoke and J. A. Jordan, East York.*



# Bud Cliff steps down



D. P. (Bud) Cliff's public life just doesn't add up. When he started out in 1937 as a town councillor in his native Dundas, he set himself a goal of 15 years' service. Now, 32 years later, he's finally stepping down.

But then, for people who know him, double the effort is the norm for Bud Cliff.

After his term on council, Mr. Cliff served as Wentworth County councillor and warden until 1945 when he was elected Mayor of Dundas. At the same time, he automatically became a member of the local PUC and was eligible to attend meetings of District 5 of the Ontario Municipal Electric Association.

Announcing his retirement as first vice-chairman of Ontario Hydro last month at a District 5 conference in Delhi, he recalled his first district meeting. "I met a grand group of fellows," he said. "It was the friendships developed at that meeting that prompted me to run again and again in Dundas."

From then on, Mr. Cliff's public life followed a meteoric path. In his second year as a commissioner, he was made a director of District 5 and in 1949 became president. He was elected OMEA president for the entire province in 1950.

"It was District 5 which gave me the opportunity to place my foot on the first rung of the ladder," he says.

Mr. Cliff says he vigorously protested when contemporaries said he should run for the OMEA presidency. "I hardly knew a soul and I was sure not many knew me." But he was elected.

Immediately after his presidency, Mr. Cliff was appointed secretary-treasurer of the OMEA. He was the fifth man to hold this office.

Four years later, in 1956, he was appointed a commissioner of Ontario Hydro. For a number of years the OMEA had pushed for representation on the provincial commission and when Premier Leslie Frost gave consent, the man from Dundas and Lt. Col. A. A. Kennedy, of Owen Sound, were asked to take on the job. Significantly, Mr. Cliff's appointment came 50 years after the birth of public power in Ontario. He recalls the months of hard work he put in preparing for the half-century celebrations at Kitchener — the first municipality to receive power from Ontario Hydro. "You can imagine my disappointment when, a short time before the event, I was taken ill and couldn't attend."

When he took on the Ontario Hydro job, Mr. Cliff relinquished his Dundas PUC position after 11 years, four as chairman. And although he was instrumental as OMEA secretary in developing the presentation of certificates to Hydro commissioners for 15 years of service, he was not to receive one himself.

After 13 years as OMEA secretary-treasurer, he stepped down in 1965. At the time, he explained: "It's a case of OMEA work outgrowing me rather than the other way around. The association's role has grown to such an extent that it demands the full-time services of a secretary. I feel there is need for new blood."

In 1966, when Ross Strike retired as Ontario Hydro chairman and George

Gathercole took over the reins, Mr. Cliff became Hydro's first vice-chairman.

"Throughout all this I sought no office. I never asked anybody for support," he says. "Nevertheless, fate sometimes plays a peculiar part in a man's life."

But his capacity for hard work may have played as big a hand as fate. Certainly, in his home town of Dundas it hasn't go unnoticed. The local Chamber of Commerce honored him for his outstanding public service record in 1960 by naming him Citizen of the Year. Particular mention was made at the time of his work in organizing the Dundas Hospital Society Dundas Recreation Commission. Earlier this year, he was the guest of honor at a civic dinner. He received an illumination scroll which said in part: "As a result (of his work), great progress and improvement has been made for the lasting benefit and pleasure of the citizens of this community." Special attention was drawn to the 20 years of service Mr. C gave to the Community Centre Board and Recreation Commission.

For a number of years, he was vice-president of the local Children's Aid Society and he also initiated and took charge of a county-wide assessment by A charter member of Dundas Rotary Club. Mr. Cliff says he tries to get to meetings no matter where he is.

When Mr. Cliff was not about Hydro business, he travelled coast to coast as vice-president and sales manager of the Dominion Lightning Rod Company. He is the third generation of the family to be connected with the firm. His grandfather started it in the 1890s. It is a rather unusual business being only one of five lightning rod companies in Canada.

Bud Cliff takes his retirement philosophically enough. "We are moving into an era where difficult chores lie ahead," he says. "They should perhaps be borne by younger shoulders. Sometimes I feel guilty that I am leaving at this exciting time. Of course, all good things must come to an end. I look forward to doing many things I haven't had time for in the past 50 years." □



# long hydro nes

## test on Nato

hundred and twenty-five delegates got an up-to-the-minute not only at the Ontario but the international scene at last th's AMEU Eastern Accounting Conference in Smith's Falls. the opening day banquet Ian Wahn, MP for Toronto St. s, outlined Canada's Nato policy for the utility representa-. Then two views of Ontario government action were covered e afternoon. R. J. Boyer, Ontario Hydro vice-chairman and P for Muskoka, spoke about regional government and its ct on utility commissions while A. J. Humber, of the Municipal rs department, talked about the Smith Report on Taxation and possible effects on utilities. Other sessions included a film and on customer relations and a panel discussion on stores rol.

leading the group for the 1970 conference at Peterborough D. B. Best, Peterborough, chairman; G. D. Chambers, ceester, vice-chairman; R. Symonds, Port Hope, secretary-ur; R. Burbidge, Ottawa; Kenneth McCaig, Kingston; . Borrowdale, Oshawa and T. W. Elson, Barrie. □

## n years to the day

ada's Prime Minister Pierre E. Trudeau and United States ident Richard M. Nixon met in the middle of the St. Lawrence r June 27 to renew friendly relationships symbolized by the 0 million St. Lawrence Power Project, built by the two nations. meeting marked the 10th anniversary – to the day – of the nal dedication of a friendship monument by the Queen and Nixon, then Vice-President of the United States. r. Trudeau was escorted by Ontario Premier John P. Robarts,



ol of friendship

right, and Ontario Hydro Chairman George Gathercole, who is shaking hands with the U.S. President. Mr. Nixon's party included New York Governor Nelson A. Rockefeller and Power Authority of the State of New York Chairman James A. Fitzpatrick.

The two met at the site of the International Friendship Monument which marks the international boundary. Unveiled ten years ago the monument is inscribed, "This stone bears witness to the common purpose of two nations, whose frontiers are the frontiers of friendship, whose ways are the ways of freedom, and whose works are the works of peace."

Prior to the meeting, Mr. Trudeau visited the powerhouse of the Robert H. Saunders-St. Lawrence generating station. Nearly two million kilowatts of power from the twin project is shared by Canada and the U.S. □

## Regional job switch



Gordon M. McHenry



George R. Currie

Ontario Hydro's Western Region manager, Gordon M. McHenry, has been appointed director of labor relations. He will be succeeded as manager in London by George R. Currie.

Mr. McHenry, a graduate of the University of Toronto in electrical engineering, has been manager of Western Region since 1964. Among several positions he has held since joining Hydro in 1948 are those of consumer service engineer in London and manager of residential sales at Head Office. He was president of the 25,000-member Association of Professional Engineers of Ontario last year.

Mr. Currie, who joined Hydro in 1939, has held consumer service posts in Ottawa, London and Toronto. An electrical engineering graduate of the University of Toronto, he became consumer service and sales engineer in Hydro's Central Region in 1967 and director of consumer service last year.

## Nuclear onion

Layer by layer, as if they were peeling an onion, experts from 10 countries took a searching look at nuclear power at the recent Canadian Nuclear Association conference in Montreal.

For three days nearly 370 delegates reviewed Canada's heady progress in exploiting nuclear energy and the dazzling prospects of producing low-cost electric power – so low, in fact, it would compete with hydro-electric sources.

In his keynote address as CNA president, Ontario Hydro Chairman George Gathercole said that at this stage no one can say which reactor system will prove to be the most reliable, efficient and economic.

"I believe that the goal of low-cost power from nuclear fission may be reached by different routes, and the Canadian approach



which is based upon Canadian talents and natural resources may be the best."

Mr. Gathercole said the hopes of Canada's nuclear power industry rested on the performance of the Bruce, Pickering and Gentilly plants. Although their capital investment was higher than that of comparable coal-fired installations, nuclear stations were far more economical to operate. □

## Banish washday blues

There'll be nothing dirty about an electrical industry promotion this fall. Conducted jointly by the Canadian Electrical Association and the Canadian Electrical Manufacturers Association, the mid-September to mid-November campaign will put the push on automatic washers and electric dryers.

Leading manufacturers will participate in an advertising campaign at national and local levels as well as a dealer-salesman contest. Dealers themselves will be actively promoting the "Banish Washday Blues" theme. Provincial and municipal utilities from coast to coast will supply display kits and join in newspaper, radio and TV advertising. □

## Power picture

Over 180 municipal utility officials from across Ontario's north attended AMEU district meetings at Port Arthur and North Bay. Subjects embraced in the conferences covered a wide range of topics including regional growth, regional government, metering and the rise of the cashless society.

At the North Bay meeting of District 9, T. E. Flinn, manager of Ontario Hydro's Northeastern Region, told delegates that in 1968 the region hit a peak demand of 857,000 kilowatts — seven per cent higher than the previous year.

"Our smaller utilities are certainly not taking a back seat in the load growth department," said Mr. Flinn. "I note that Cache Bay's load growth from 1967 to 1968 was 26 per cent."

Speaking on the growing trend toward regional government, D. G. Hugill, first vice-president of the OMEA, said that changes required elected officials to submerge their personal ambitions and act together in using their experience and local knowledge to make the new regions workable. Also required was a group of experienced civic officials who could make the system work.

"Fortunately, for all of us, we do have such a group who operate our present municipal systems and these people have a lot to contribute to the eventual success of regional government," he said.

At the District 3 meeting in Port Arthur, James Durand, operations engineer for Ontario Hydro's Northwestern Region, spoke about the tie-line which will link Northwestern Ontario's electrical network with the rest of the province. He said that the bulk of the power will move from east to west over the 230,000-volt link.

Contrary to some people's apprehensions in the Northwest, Mr. Durand said "very little power" would flow out of the region. He predicted that within a decade the Thunder Bay generating station, the only coal-fired plant in the area, would have to be greatly expanded. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Sarnia Hydro took city council for a ride in May and, from all reports, the experience was well appreciated. The ride in question was a tour of the electrical distribution system for the chemical

city, and was arranged for councillors, city executives, and other officials. After the hour-long tour, guests were given an insight into future plans for the municipal hydro system.

Among the things that councillors found most interesting were bungalow-type sub-stations, designed to blend in with homes in the neighborhood they serve.

Summer is the time electrical utilities planning to enter the Ontario-wide PR award program must put on their thinking caps. The program will single out a utility in each of three categories — large, medium, and small — for recognition at next year's annual meeting in Toronto.

All major community relations activities are eligible for consideration. These include communications projects aimed, for instance, at employees, local news media, municipal council and customers. At the end of the year, aspiring utilities compile a record of their objectives and how they achieved them, and supply it to either the OMEA or AMEU office in Toronto. Judging will take place next January and February.

## municipal briefs

**Port Credit** will go underground again this year. Conduit, re- to take electric, telephone and television cables, will be installed in conjunction with the town's re-paving program. Areas east of the Credit River will be completed this year. With a target of 100 per cent for the elimination of overhead wires, Port Credit Hydro manager Bill Munden says the conduit is being placed when streets are widened and re-surfaced. Last summer, this work was completed for the half of the town west of the river. "We don't want to put up roads widened this year to lay cables next year," he says. Actual cables will be placed in the conduit as existing services require updating or replacement.

**Jack Christie**, vice-chairman of East York Hydro, has been named head of the public relations committee for District 4, OMEA. Other members are Don Glass, Aurora Hydro, and Ed Steer, Markham Hydro. J. S. Shand, manager of East York Hydro, serves on the corresponding AMEU public relations committee.

**Chinguacousy township** is the site of a proposed satellite town for 47,000 people. Developers say the 2,200-acre site would contain detached, semi-detached, row and condominium housing, apartment towers and interior court complexes. To help to eliminate air pollution, cars would be banned from central areas. Instead, electric trains and an enclosed electric golf cart type of transportation would be used.

**Stewart Holt**, manager of Midland PUC, has been appointed chairman of the Georgian Bay Waterworks Conference for the coming year. At the same time, he was presented with a desk set and scroll for 10 years' service as regional director of the AMEU.

## May energy production

Primary energy provided by Ontario Hydro in May totalled 4.8 billion kilowatt-hours, an increase of 8.2 per cent over the same month a year ago. For the first five months of 1969, the total is 25.44 billion kilowatt-hours, up 7.5 per cent over the same period last year.

Adjusted for seasonal influences, primary energy demand in May was 4.88 billion kilowatt-hours, 1.2 per cent less than the previous month. The seasonally adjusted total for May represents 58.54 billion kilowatt-hours at annual rates. This is 420.84 per cent of the energy demand in 1949.





## Don wright sees it

It was when a man who built a better mousetrap could sit back with an air of confidence and wait until the pitter patter of feet announced that the world was, indeed, beating a path to his door. Maybe he still can – provided he's prepared to single a carrot or two for horsetrading purposes. The mousetrap we have in mind is actually a fairly sophisticated technique for converting nuclear energy into electricity with the use of enriched uranium and heavy water. They call it CANDU and so far, at least, our shores have not been overrun by foreigners clutching fistfuls of money to exchange for our kind of nuclear plant. Not that the mousetrap isn't any good. Capacity seems to be the one ground largely ignored in the explanations following each Canadian report on the nuclear sales front. Greece was the latest instance. Britain won out here with some delicate footwork involving a barter deal for Greek tobacco.

Perhaps the solution lies in dusting off some of the old-time Western horsetraders who, reputedly, could deal the unwary out of their buckskin overwear. Glass beads and a buffalo hide or two would be a small price to pay for a multi-million dollar nuclear order.

In the face of it, though, the Greeks shape up as pretty fair horsetraders in their own right. They stand to gain a shiny new nuclear plant capable of supplying vital electricity for decades to come. Britons end up with bad lungs and tons of cigarette butts.

Speaking of cigarettes, that comforting element of doubt which smokers have been hugging to their heaving breasts ever since the link between tobacco and disaster was first suspected, has all but winked out. Only the occasional outburst of protest on the part of the vested interest now fans that faint ember of hope and smokers who persist do so in the full knowledge that each gasp may be their last. And yet the smoker retains an element of respectability as he lies down the paths of glory.

Smokers, on the other hand, have been condemned down through the ages and tolerated because their weakness has tended to ease the tax burden on the more responsible members of society. But things may change.

A new booklet by the British Medical Association, cigarette smoking is condemned out of place as one of the villains contributing to the incidence of coronary thrombosis. Old

Grandfather, on the other hand, emerges with new virtue.

States the booklet: "All our evidence points toward alcohol being good for those who have a tendency toward coronary heart disease – and a reasonable intake may well be a preventative."

If an ounce a day will keep the doctor away – who needs an apple? Besides, it explains the conduct of our late Uncle Looie who spent most of his adult life trying to prevent a heart attack. He died of sclerosis of the liver.

■ New scientific developments of mind-boggling proportions are a dime a dozen these days, but some of the more recent discoveries affect the very stuff of which we are composed.

A Brazilian scientist, for example, claims to have discovered a new state of active matter within the atom's protons and neutrons which most of us have been content to accept as the most elementary particles in existence. He's calling the new ingredient "fireball" and hints that the production of nuclear power will be a piece of cake once these babies get into harness.

However, the discoverer has been accused of sensationalism in the past and it's to be hoped the fireballs witnessed at one end of the microscope were not the result of firewater at the other. We cannot afford to hitch our power programs of the future to scientific pink elephants.

■ In the light of recent wage increases on the part of plumbers, electricians, paper hangers and the like, one might be excused for seeing it all as a sly plot on the part of government to solve the shortage of college accommodation. With wages like these available at the snap of an overall, who will want to be a professional?

And we haven't seen anything yet. In California, the plumbers are after a tidy little package which would bring their annual take to something substantially above \$20,000.

This state of affairs could, in fact, herald a fundamental change in our social structure the like of which we haven't witnessed since man emerged from the cave and entered the apartment. Under the new order, we may find ourselves marching to the skirl of the water pipe and doffing our caps to a brand new flag – the monkey wrench and the plunger rampant on a field of greenbacks. Our scientists, artists and other eggheads will be vying for sponsorship under the gracious beneficence of Peter the Plumber.

It's been a lengthy process, but the results are not really surprising. In a society where plumbing is worshipped as a deity, it was inevitable that its high priests should start pulling the chains.

■ Solidarity forever is the working man's hymn and one of the most impressive demonstrations of togetherness we've heard about occurred recently when the entire field force of the Wiarion PUC walked off the job as a single man. Actually, there were two and both of the boys skinned out of their sandwich boards when a transformer fire demanded their attention and brought them together with management. A settlement was soon effected.

■ Another impressive provincial development of recent vintage has been the fantastic growth in population chalked up this year by the community of Punkeydoodles Corners, near Kitcheener. One of the fastest growing urban centres in the world, its population leaped by more than

16 per cent virtually overnight. That was when Mr. and Mrs. Dale Wagner purchased an old farmhouse in the community and announced they were moving in. Rather static for many years, the Punkeydoodles population shot up from 12 to 14 with the new arrivals.

■ Anybody who imagines that Canada stands alone with its dual language problem should cock an ear in the direction of Southern Ireland. In a note sent us recently by Reg Carson, of our Stations Design Department, on stationery acquired from the Electricity Supply Board of Dublin, the letterhead is printed in Gaelic and English with the former enjoying top billing.

In Gaelic, the Electricity Supply Board, of 27 Lower Fitzwilliam Street, Dublin, comes out like this: Bord Solathair An Leictreachais, 27 Sraid MacLiam Iochtair, Baile Atha Cliath, Eire.

Mr. Carson took time out during his Irish holiday to visit the generating plant at Ballyshannon. He reports as how the plant is fed by Lower Lough Erne, which is in the North (politically), empties into Donegal Bay, which is in the South (politically) but actually flows west, which is in the best tradition of Irish logic.

■ Call 'em gadgets if you will or just another kink in madame's romance with do-it-yourself beauty aids, but those new electric hairsetters which have been sweeping the market of late are having their effect on everything from coal shipments across the Great Lakes to the amount of muscle required from our hydro-electric plants.

That's overdoing it, perhaps, but the connected load of these little porcupines in the United States is estimated to be in excess of 5,000,000 kilowatts. In other words, if all the ladies in the US decided to curl together, they would require about the same amount of electricity as we can produce from all of our generating stations on the rivers of the province, including the Niagara and St. Lawrence.

But, it's best not to think about how vulnerable we are to the feminine whim – it's enough to curl your hair.

■ Tip-of-the-hat this month goes to Richard Keefer who has invented a fuel cell which threatens to put us all out of business. This Grade 13 Toronto high school student won first prize in the chemistry division of an international science fair in Texas for a battery that runs on sugar.

As a portable source of electric power, according to one report, it could run every household appliance from vacuum cleaners to radios and even replace gasoline as an energy source in automobiles. How do you recharge the contraption? Simply add a lump or two from the sugar bowl. If sugar isn't available, it will run just as well on sawdust, paper or whatever's available from the nearest garbage can.

Sounds like the kind of thing mankind might go for if confronted by a beautiful fairy godmother with a magic wand and a single wish to bestow (we said mankind, not engineers). In any event, Richard's fuel cell makes enough sense to have interested some of the top scientists and corporations in America and there's a good chance Mr. Keefer will end up stuffing \$100 bills into his battery just for a charge. □



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**Follow the leader?** Of course. Everyone follows the surveyor. And whether it's a hydro-electric site deep in the Ontario bush or a prospective transformer station in some bustling municipality, the Hydro surveyor will check out every angle. His dedication, and the dedication of those who'll follow him, is one reason why Ontario's electrical rates are among the world's lowest.

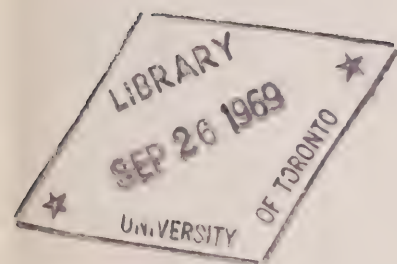


HA2ΦNEP  
-H95



- kingdom of kites
- radioactivity — it's good for you
- fresh look for the mint

**ontario hydro news**  
september/1969







# news september/69

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## the cover

Kite veteran Ken Lewis assembles a multi-cellular example of his unusual art. As proof that kite flying is more than kid's stuff, Mr. Lewis has been called upon to launch kites to monitor atmospheric conditions. His story starts on the opposite page.

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## Viewpoint

# fear and the status quo

Many of our ways are dictated by fear of the unknown. That's why we hire policemen, maintain armed forces and buy life insurance. It also accounts for our religions and explains why we instinctively resist change. It's always easier to deal with familiar situations and proven procedures than to break new ground.

Resistance to change is normal but the record down through the years suggests that most of our fears have been groundless. Excerpts from a letter to Andrew Jackson, 7th President of the United States, from the governor of New York State serve to show the rationalizing we resort to in defence of the status quo :

"The canal system in this country is being threatened by the spread of a new form of transportation known as "railroads", the governor cautioned. "If canal boats are supplanted by railroads serious unemployment will result. Captains, cooks, drivers, hostlers, repairmen and lock tenders will be left without means of livelihood, not to mention the numerous farmers now employed in growing hay for horses."

Boat builders would also suffer, said the governor, while towline and whip and harness makers would be left destitute. He even called upon the Almighty for support.

"As you may well know, railroad carriages are pulled at the enormous speed of 15 miles per hour by engines, which in addition to endangering life and limb of passengers, roar and snort their way through the countryside, setting fire to the crops, scaring the livestock and frightening women and children. The Almighty certainly never intended that people should travel at such breakneck speed."

Whether or not the Lord disapproves of the way we've been violating the 15 mile per hour speed limit may never be known, but the governor's concern in 1829 was obviously misplaced.


Not that we're in any position to chortle. Much the same cries of alarm have attended the development of automation and the computer. Yet programmers and technicians are in such short supply in the United States that recruiters are combing the prisons for likely trainees. And even if we do manage to develop our technology to the point where a three or four day working week becomes feasible, where is the tragedy ?

No society can afford the luxury of resisting technological and social change if it hopes to maintain a position of leadership. In Ontario, at the present time, we are changing from a rural to an urban society, we are according new priority to the problem of pollution, we are altering our system of municipal government and we are taking new approaches to education, welfare and health.

Once the need for change is recognized, or it begins to take place through the natural play of economic and social forces, we have a right to look to government for leadership and direction. But many aspects of change cannot be legislated. Statutes are powerless to command co-operation or goodwill. No law can ensure that open-mindedness and common sense shall prevail.

Change for the sake of change is something else again, but it would be well to keep the whip and harness makers in mind when we find ourselves digging in our heels. Ruts may be comfortable but they seldom lead to progress.





# go fly a kite

by Harriet Law

## But not near power lines, says veteran kite flier Ken Lewis

...e flying, says an enthusiast, "is  
...try in motion." One could add that it  
...also the pastime of the great, the  
...r-great and, of course, the kids.

...nel John Glenn, actor Jimmy Stewart  
...folk singer Burl Ives are all kite  
...s. Then there's "The Man from Glad"  
...o makes his appearance on a TV  
...ommercial, zooming in on a kite to  
...housewives in distress.

...there's Ontario's own Ken Lewis  
..., for the uninitiated, is Canada's  
...e King." (His royalty is proclaimed on  
...back of his shirt — donated by a  
...le manufacturer who once asked him  
...uild a giant green pickle kite).  
...Lewis is a walking encyclopaedia  
...te lore.

...I'll find Ken Lewis any weekend at  
...e Curtis Park on the shore of Lake  
...ario — "far away from Hydro  
...," he hastens to assure you. He  
...ds wrinkling his brows against the

sun's glare as he lifts a brilliant red kite  
into the still blue skies.

"Only amateurs need to run with a kite  
— or need a wind to lift it. I can get  
one up in a car park from the thermals  
alone. I've gotten one up in a TV  
studio, before the cameras, just from the  
heat of the lights."

Mr. Lewis works by weekday as a  
hospital technician and by weekend as a  
"professional" kite master. In his ritual  
kite-raising in the park he is joined by  
serious devotees including a distinguished  
lawyer and a medical doctor as well as a  
clutch of curious children.

For Mr. Lewis, the pleasure in raising  
his favorite box kite is no less than his  
assignment with the Canada Centre  
for Inland Waters. For them he sent off  
a thousand-dollar kite with survey  
instruments attached to help patrol air  
and water pollution.

When Ken Lewis starts talking kites —  
whether ancient history or present day  
inventions — he always stresses safety

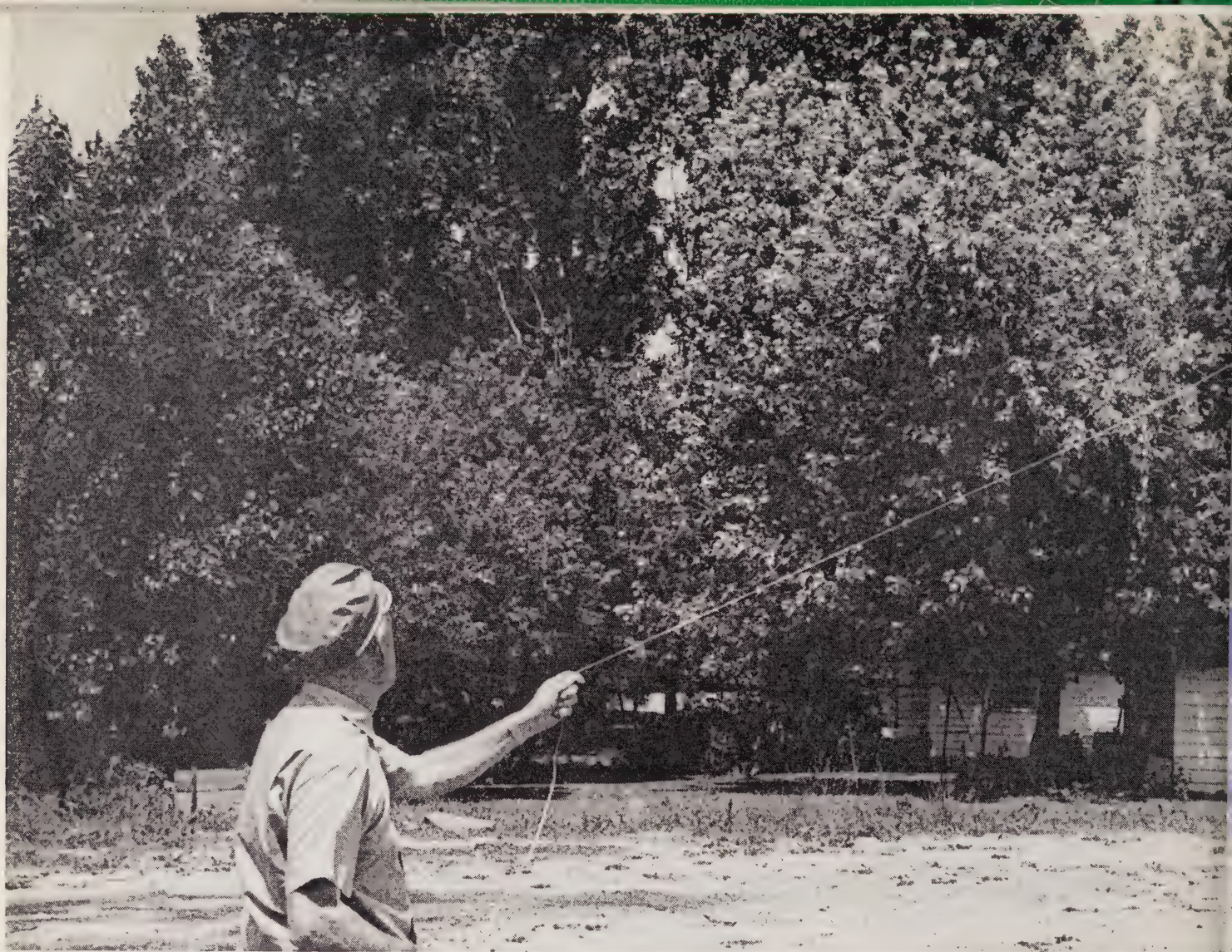
precautions. "Never fly a kite near  
wires of any kind," he advises.

And if you stay long enough watching  
him and listening to him you will  
get a brief history of the kite punctuated  
with "Oh, there's so much I could  
tell you about kites. . ."

For example, he might ask whether you  
knew that Alexander Graham Bell  
was the first Canadian kite inventor? Or  
that kite fights sponsored by the  
Canadian National Exhibition each  
summer are Korean in origin? The object  
of the kite fight is to sever another man's  
kite line by crossing it with one's own  
and giving a rapid tug. Apparently  
the line is prepared for the purpose by  
passing it several times through a  
mixture of glue and powdered glass.

The best fighting kites, says Mr. Lewis,  
travel at great speed. And if they are  
to be manoeuvred in any direction,





*With deft pulls on the string, Ken Lewis manoeuvres one of his collection of 2,200 kites into the air.*

they must be delicately balanced and perfectly symmetrical.

Indeed, the kite does have a long and fascinating history. The earliest use was probably in China, long before the birth of Christ. There's even a report of a General Han Hsin flying a kite over a palace he was attacking. The idea was to judge the distance between his army and the palace walls so that a tunnel of correct length might be dug to allow his troops to enter. Early Chinese kites were beautiful and varied in form. Some were equipped with "hummers", musical instruments on which the wind played.

When the Japanese adopted kite flying, they concentrated on size. They made larger and larger designs until, by the 19th

century, one kite needed 150 men to launch and fly it. It was 60 feet across with a tail 480 feet long.

The development of the kite in Europe is more difficult to trace. But Clive Hart, in his book on kites, suggests that the "windsock", a hollow cloth tube used by Roman armies as standards, may have encouraged their construction. But whether the idea of kites was brought from Asia or developed independently is hard to say. Later, the use of "Fire Drakes", or kites with tails laden with firecrackers, became a pastime in England.

An amusing use of kites was indicated in 1746 in *Gentlemen's Magazine* when the writer suggested that kites should bear the painted, glowering visage of the Duke of Cumberland, and be flown over the Highlands to discourage skulking rebels!

Kites were, of course, important forerunners of the airplane. From earliest times, the possibilities were explored of building a kite large enough to bear man aloft. But this requires great stability and manoeuvrability. The search for stability was carried on in the latter part of the 19th century by two designers – William A. Eddy, an American, and Lawrence Hargrave, an Englishman. Eddy was a journalist and an extroverted showman who delighted in raising flags over New York and hanging lanterns in the sky at night.

Hargrave was the complete opposite. He was quiet and reserved, with high ethical standards – he refused to take out patents on his work. He was also a serious student of aerodynamics.

Eddy's contribution to kite history was the tail-less kite – an improvement on the buoyant Javanese kite of 1890, which he had to re-invent as he had no measurements. His "Eddy bow kite" was self-stabilizing, with a prominent "bow





ned by the cross-stick. The kite  
ider than earlier designs, providing  
er lift.

grave made several contributions  
ite design. His first was the  
edra - with wing-like extensions. But  
most significant invention was a  
design which he called the  
lular kite".

ater improvised on this employing  
oil surfaces which gave added lift  
improved the efficiency of the kite.

first man-lifting kite built in Canada  
Alexander Graham Bell's Cygnet,  
ch had more than 3,000 cells and  
launched by steamer on Baddeck  
in Nova Scotia. It was equipped  
light floats, and in the centre was an  
hing for a man. The kite was  
ched by men aboard the steamer,  
v beautifully for seven minutes",  
then was allowed to settle on  
water.

Kite flying wasn't limited to kite  
enthusiasts, however. It was also  
considered by virtually anyone who ex-  
perimented with heavier-than-air  
machines in the last part of the 19th  
century. The Wright Brothers, for instance,  
experimented with a biplane kite they  
flew from a system of lines to test the  
control of lifting surfaces. Unlike  
Hargrave's box kite, they used no  
vertical stabilizing surfaces between the  
wings, stability being maintained  
chiefly by the control lines. Their work  
with kites led them to trials with gliders.

Today, people can still experience the  
excitement of watching a man being  
lifted by a kite. Visitors to the Canadian  
National Exhibition water show  
each year see a man ride a kite pulled  
by a high-speed boat.

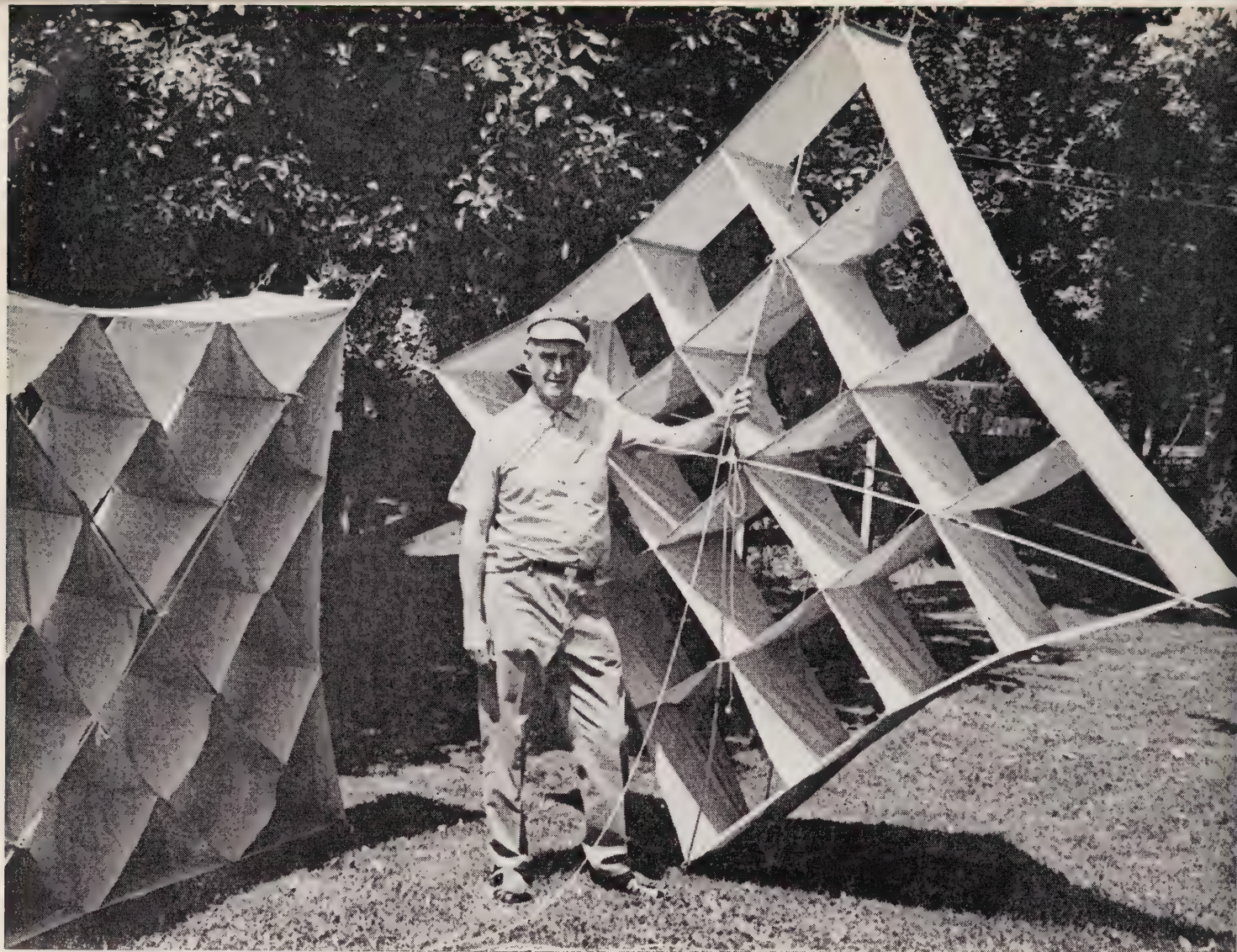
Kites have been employed for more  
serious purposes, though. Their use in  
wars may appear ingenuous to those  
familiar with the sophistications of  
radar or napalm. Yet in the last war a

barrage of kites protected an entire US  
fleet on the Murmansk run. Kites were  
flown from lines 2,000 feet long  
from which wires were suspended. "The  
wires could cut the wings right off  
a dive bomber", recalls Mr. Lewis.

The Germans used kites bearing a  
human scout to increase the observa-  
tional range of their U-boats in the first  
world war. Their kite was an elegant  
box type and was independent of natural  
winds. A breeze created by the  
submarine itself was sufficient to lift  
it with the aid of a winch.

Another man-lifter used for military  
purposes was S.S. Cody's "bat kite",  
which consisted of several kites to  
provide initial lift followed by another  
kite beneath which a man was suspended  
in a wicker chair. He was equipped with  
camera, firearms and a telephone for





*Kites of all shapes and sizes, kites of all colors, both in the workshop and outdoors. Shown with the late President Kennedy is a flier of a different breed, but a kite enthusiast nonetheless, astronaut John Glenn.*

maintaining ground contact. The British War Office used it in trials in 1904 and even placed warships at Cody's disposal for practice.

Kites were also used by the thousands for gunnery targets by the United States. One was the most sophisticated, controlled kite devised. It used two lines wound on synchronized reels. At the bottom of the spine of the kite was a rudder, controlled by tension on the lines. By manipulating the rudder, the kite performed like an airplane.

Benjamin Franklin's experiment is perhaps the most famous of all scientific applications of the kite. With it he

established that lightning was electricity. The details are known by most school children: in 1752, Franklin went out into a thunderstorm with a "common kite"—a large silk handkerchief and two cross-sticks. His intention was to draw down discharges of lightning from the clouds. He was successful—receiving a considerable jolt in the process.

In what must have been the coldest kite flight in history, the explorer Sir William Parry launched an experiment at Igloolik, in the Canadian Arctic. It was perhaps the first serious application of the kite in the 19th century. During the voyage, Parry wanted to observe and determine the law of variation of the atmosphere temperature according to height above sea level in very cold regions. He attached a thermometer to his kite and in sub-zero temperatures stood patiently waiting to see if the

reading would change from its minus degrees on the ground. No variation of temperature occurred.

So useful did kites become in scientific investigations that when full-time weather bureaus were established in North America, kites were employed to obtain detailed records of the upper atmosphere. Staff at these stations experimented with the shape and design of the kites. The hexagonal "barn doo" type was popular.

The stations were equipped with power-driven winches, several miles of piano wire and clamps for attaching the trains of kites to the main line. After the first world war, however, most readings were taken from aircraft. In fact, the profusion of kites from these stations was considered a menace to aviation, and kite stations were closed in 1933.

The move was welcomed by many who felt that this type of research was dangerous. Not only did electrical discharges often melt or vaporize kite





s, shocks were frequent. Potentials as high as 50,000 volts were recorded on kites before a discharge fused the line. At least one fatality resulted from just such a discharge. In 1909, a British naval captain was killed in an accident while flying a kite at 3,000 feet.

Modern kites today are built for safety, according to Mr. Lewis. Kite lines are now constructed from nylon or "button thread" and the cross-sticks are no longer made of wood, but of reinforced plastic. However, the warning against flying kites near electrical lines is still sound advice.

Traditionalists wince at the use of modern plastics in kite building, they are positively pained to discover that the computer now aids in the primary design work.

One year, Ken Lewis was approached by researchers at the Canada Centre for Space and Waters and helped to launch a 100 kite, 165 square feet in area.

Attached to the kite were instruments to monitor and record air and water currents.

Why such a large kite? "We fed all sorts of information into the computer," says Mr. Lewis, "like what we wanted the kite to do, and under what conditions we wanted to fly it. Back came the information telling us the correct shape of the kite and the thickness of the material required to bear the weight of the instruments."

But what gives Mr. Lewis his biggest thrill is building kites himself. Although he doesn't make a living from them, he gets enough customers to keep him busy. He admits to owning over 200 large kites — one 14 feet by 11 feet — and as many as 2,000 smaller ones, some shaped like butterflies and bees.

His favorite, he says, is the sensational parafoil invented by Canadian-born Domina Jalbert, who is now with the Space Recovery Research Center, Inc., at Boca Raton, Florida. Jalbert's "flying mattress" is a series of long cells

sewn together to behave like an airfoil.

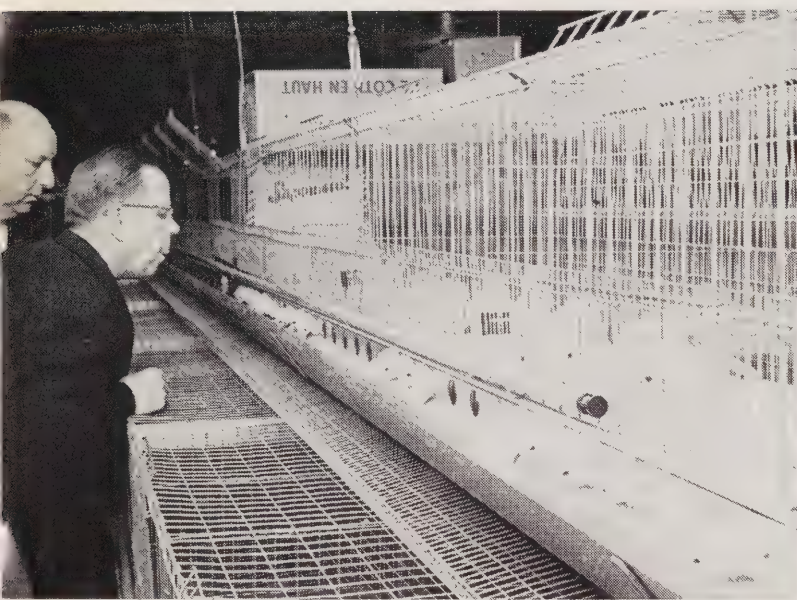
Mr. Lewis flies his parafoil on an 860-pound test nylon line anchored with a pulley to a stake driven into the ground. It requires three to four men to haul on it.

The excitement of kite flying, says Mr. Lewis, is to use the finest thread possible — "ordinary button thread" is best. The finer the thread, the better the lift. How much string to use? It's a mathematical equation all right, he says, adding that "if the string is longer than the area of the kite, the kite is no longer flying".

The knack, of course, is to get the kite up — "Kids end up running up and down the park furiously in all directions," says Ken Lewis. "That's the amateur's way," he adds as he calmly sets aloft his brilliant red "mattress" to the awe of gathered admirers. □



# OODLES OF



Photos by Harry Wilson

*Who's chicken? Whose goose is well and truly cooked? Anyway, the kids all thought it was fun, down on the farm.*



## **... and a goose or two thrown i**

Six thousand geese, over 100 tons of noodles, umpteen gallons of milk, feather pillows and a kinds of fruit and vegetables emanate each year from the 1,000-acre co-operative owned and operated by the Christian Brethren near Plattsville.

Not only does the farm support 105 men, women and children belonging to the sect, there's enough money left over for several charitable enterprises. The community has its own stationary engineers, electricians,



# NOODLES



mechanics, teachers, cooks, herdsman and other specialists.

Since its formation in 1941, the enterprise has prospered steadily thanks to hard work and modern agricultural methods. For instance, there are about 500 electric motors around the farm, driving all manner of equipment from pump pumps to a feed pelletizer.

The Christian Brethren's operation was one of the highlights of a tour for more than 150 representatives of government, industrial, and

financial institutions and the news media. Held in different parts of the province each year, it is organized by Ontario Hydro and the Canadian Electrical Manufacturers Association to enable people to see at first hand how electricity is used on the farm.

Also on the tour, which was confined to the area around Guelph, were visits to a chicken farm, a 300-acre dairy farm, a chinchilla ranch and one of the largest and most modern sales arenas in North America. A varied assortment, but with one common denominator — considerable and ingenious use of electric power. □





## the money makers

by Hal O'Neil

Turning the Royal Canadian Mint into a money-making organization smacks of paradox. But the 61-year-old institution did become responsible for its own financial fate earlier this year when it left the federal Department of Finance to become a crown corporation answering to Parliament through the Minister of Supply and Services.

Acting Master of the Mint E. F. Brown says it's "just like starting up a business."

One of the first aims of the new board of directors is the replacement of their fortress-like headquarters, which perches formidably on the bank of the Ottawa River downstream from the Houses of Parliament. Then the corporation intends to go after the export trade.

Chairman Gordon Hunter says that Canada recently had to import some of its coinage. "It would be nice to reverse the situation and mint the coins of other nations as well as our own," he adds.

Back in the 30s, the mint plunged briefly into the export business making coins





the Dominican Republic. Since then, demand in Canada has kept it fully supplied. Common with any manufacturer, the mint has problems of supply and demand. Mr. Brown says that under the former estimates had to go in for approval as much as 18 months ahead. "But when you're dealing with people, it's almost impossible to predict what they'll want six months ahead. We have runs on certain denominations just like other businesses have runs on certain products. Now we have more flexibility and can cope better with demand."

In case in point is the half-dollar. Although the mint turned out over four million last year and has almost equalled that number for this year, only a trickle is in circulation.

As a crown corporation, the mint now works like an outside firm. The Department of Finance submits an order for a specific number of coins in each denomination. These are made, then delivered to the Bank of Canada. The Finance Department receives the bill. The mint is also free to go out and look for business. Any profits go into Canada's consolidated revenue fund.

A little known aspect of the mint's work is the refining of gold. Practically all the gold mined in Canada — 2,752,947 troy ounces last year — is sold to the federal government.

Newly mined gold arrives at the mint and is partially refined. "Scrap" gold from jewellery and dental work and even placer gold (dust) from old-time prospectors are also accepted (19,058 ounces in 1968).

The first step these "shipments" undergo is weighing. It is to be melted down individually in high-frequency electric induction furnaces to obtain a thorough assay. Small assay samples are carved out of the resulting bars to determine their gold and silver content. Payment is made on the basis of the assay reveals.

In a second operation, the yellow metal is refined by a chlorination process in which the silver and base metals in the mixture are converted to chlorides. Later, the

silver is separated out from the base metals and converted back to its metallic form. It is then cast into ingots for sale.

Nothing of value escapes from the mint. The residue of base metals goes into reduction tanks where copper is recovered as well as traces of other elements. Any pots, crucibles and other bits and pieces used in the refining are eventually crushed and sold as what the mint people call "sweep". Even exhaust gases from the furnaces aren't overlooked — electrostatic precipitators trap any valuables before the gases go up the chimney. These particles are also put into the "sweep".

With chlorination, the gold is at a minimum of 99.5 per cent fine. But it doesn't stop there. The metal is refined further by electrolysis into standard 400-ounce bars or made into granulated gold. It is now at least 99.99 per cent pure, or "four nines" as they say in money circles.

Gold in various forms is stored in a vault that would do justice to the Tower of London. Some is in coiled strips, some in bars, some of it in granular form. For jewellery and dental purposes, molten gold is dropped into water and comes out like scrambled egg.

Although Canada started issuing nickels in 1922, last year was the first in which the mint switched from silver to nickel for 10-cent, 25-cent, 50-cent and \$1 coins. The one-cent piece continues to be bronze (98 per cent copper, 1½ per cent zinc and ½ per cent tin).

Many factors were involved in the government's decision to change from silver to nickel coinage, but the main one was the rising cost and limited supply of silver. The silver content in coins has been dropping for a number of years. In 1920 it was changed from 92.5 per cent (sterling) to 80 per cent, and in 1967 it went down to 50 per cent.

"Almost all countries are getting out of silver coinage — for example Belgium, Switzerland, Britain and the United States," says Mr. Brown.

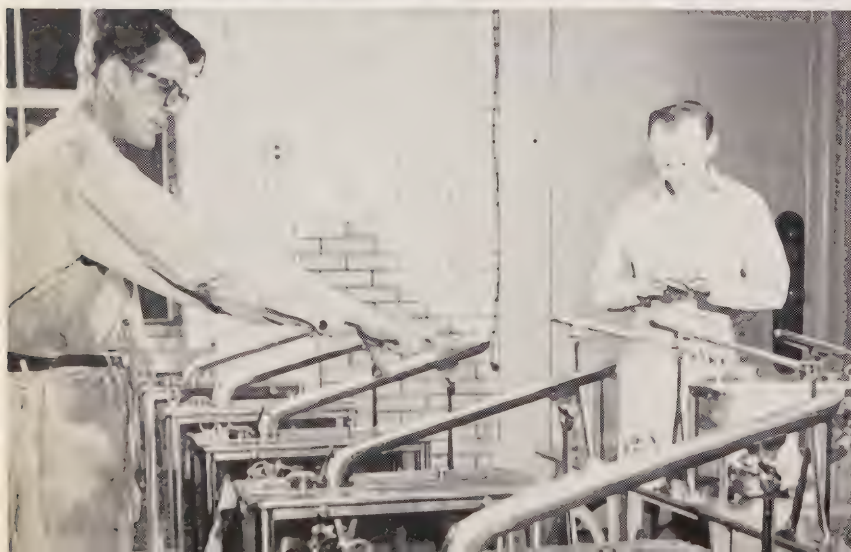
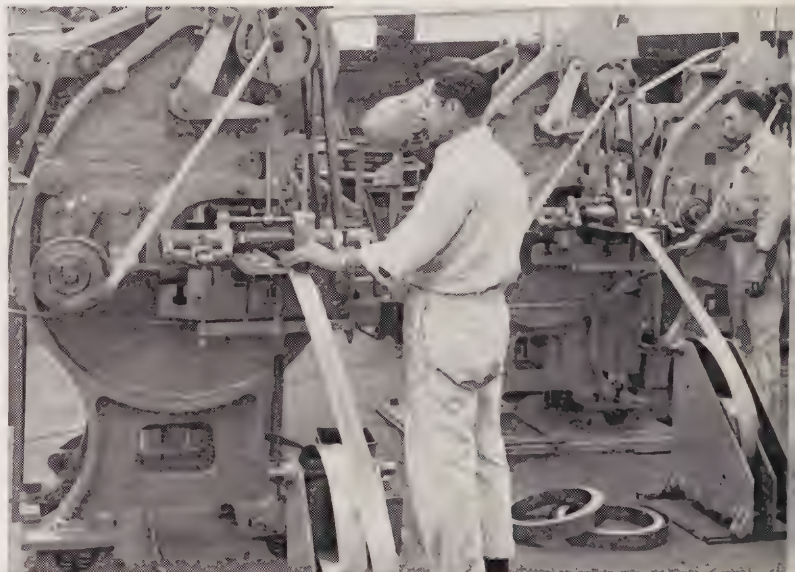
As a coinage material, nickel is considered ideal. Corrosion and wear-resistant, pure nickel retains a pleasing appearance and has good malleability so that coins can be struck to show the finest detail. There's a ready supply in Canada, the world's largest nickel producer. And seigniorage — the government gain from the difference between the cost of production and face value — is obviously much greater than with silver.

Nickel arrives from suppliers in coils of the correct thickness, ready for punching into coin blanks. Depending upon the denomination, the press can punch out as many as 8,000 blanks a minute. What's left of the strip after it has been "Swiss cheese" is returned to the supplier for credit.

Cathode copper, from which cents are made, is received in bulk. It's melted down with zinc and tin and poured into bars, then rolled to the right thickness. As might be expected, the cost of producing the different denominations varies. Out of one pound of copper, which is bought for about 50 cents, 140 pennies are made. Out of the same weight of nickel, 100 five-cent pieces are produced. Nickel costs about \$1 a pound. A dime is one









of the most profitable coins to strike because of its size and face value.

After the coin blanks are punched out they move to another machine which puts a raised but unmilled edge on them.

Then the blanks get what can best be termed a laundry treatment. The "work hardened" and dirty coins are annealed, first by passing them through a rotary electric furnace. Next they're quenched in water and passed through a series of chemical and detergent baths before rinsing. As a final step, they're fed through a rotary dryer.

Both obverse and reverse sides of the coin are struck at the same time. The blank drops into a recess containing the reverse die, then a piston-like shaft holding the obverse die drops on the coin. It strikes with such force that not only is the impression made on both sides but nickel is squeezed into a collar which produces the milled edge. The exceptions are the one-cent and five-cent pieces, which are traditionally smooth-edged.

The coin presses work at terrific speed. The noise from them sounds like a thousand trip hammers and ear plugs are the fashion for operators. The presses operate around 200 strokes a minute, turning coins into a blur of motion as they drop in, are struck and ejected.

Later, the coins are visually checked by inspectors before passing through automatic counting machines. The pieces are spilled into canvas bags and eventually distributed to the chartered banks. Since coinage must meet high standards — weight, diameter and fineness are established by law — quality control is practised. One phase is the optical examination of sample coins for imperfections. The device magnifies the coin hundreds of times.

Sometimes, detail on coins is a problem. Mr. Brown, who celebrates his 30th anniversary with the mint next month, has seen many designs in his years, but recalls the 10-cent coin in Centennial year is giving coin-makers more than their share of problems. The mackerel on the reverse side had a tendency to "ghost" so that its outline could be seen through the Queen's portrait on the other side.

"We like a design which fills the field, making use of the whole coin," he says. That way, the die exerts an even pressure over a large area."

This summer, Mr. Brown was chairman of a panel of judges which chose the design for a \$1 coin that will commemorate the centennial of Manitoba's entry into confederation. The winning design of Raymond Taylor, of Scarborough, will

be used on the obverse of the 1970 coin. It depicts the prairie crocus, the province's floral emblem, and carries the lettering "Manitoba 1870-1970" and "Canada Dollar" with a small maple leaf in each word grouping.

Once a design has been selected, engravers at the mint model it in clay on a large scale. The model is usually nine or 10 inches in diameter and is arrived at from either photographs or drawings. The man who worked on the new Governor-General's medal, for instance, had four sittings with Mr. and Mrs. Michener.

Next, the model is cast in plaster of paris in intaglio or relief. Then a cameo model is cast from this. Improvements and finishing touches to such areas as lettering, finer details and facial features are made in these stages. Finally, a cast is made in acrylic plastic, just as the coin will look.

This acrylic model is placed on a three-dimensional pantograph machine which automatically reduces the design on steel. From this comes the "master die". On occasion, engravers at the mint still execute designs directly on steel, using hand tools. In all cases, both the master and the working dies are well guarded.

"We worry about them more than we do about the coins," says Percy J. J. Lecuyer, chief of the coining and metal division.

Aside from the 783,989,624 coins produced in the 1968 series, the mint struck over 40,000 medals last year. While most medals are military, other government departments like the Royal Canadian Mounted Police are customers. The medals are made from metals ranging from gold to bronze. And it is almost a hand operation, with the older, more skilled employees doing the work. Because of their size and thickness, some of the medals are struck five or six times. This is accomplished on a press that was in fashion decades ago but ideally suited to the job.

Mint sets are another hand-crafted operation. In fact, they aren't even made at the mint's main building, but across the Ottawa River in Hull. Made up in plastic envelopes, the uncirculated coins — one of each denomination — have a face value of \$1.91. But the mint sells them for \$4. Specially packaged \$1 coins are also sold at a premium.

Mr. Brown, while acknowledging the 100 per cent mark-up, says: "The sets are costly to prepare. They are literally handled with white gloves during preparation. They are a good moneymaker, though."

And there is nothing a moneymaker likes better than making money — particularly now that the mint is really in business. □

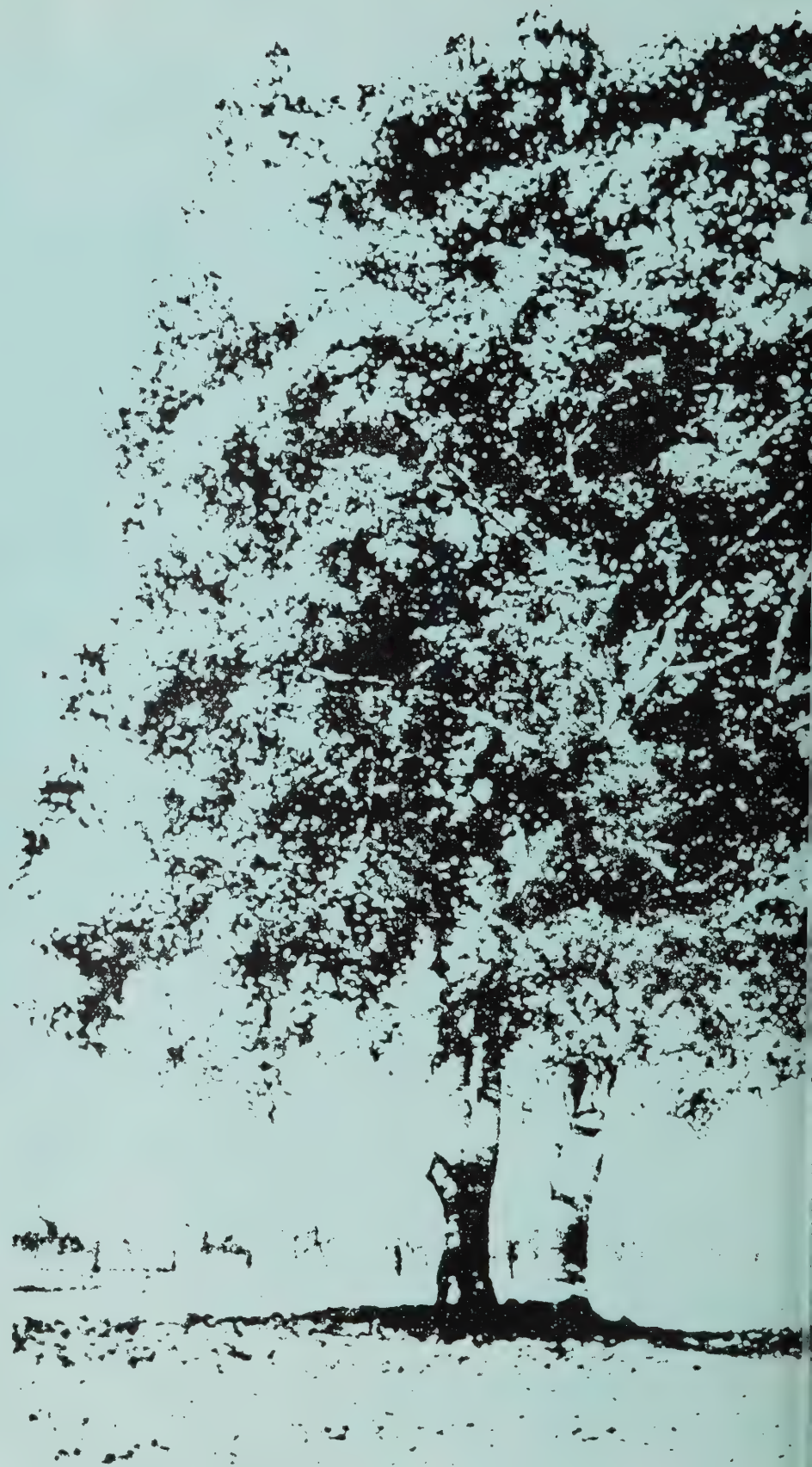


*Solid as a fortress, the Royal Canadian Mint on Ottawa's Sussex Drive is well and truly in the money making business. There, bronze bars that end up as one-cent pieces are poured, blanks are punched out of thin strips and the final product is checked, counted and bagged for market. Above is a sketch of the reverse side of the coin which will commemorate 100 years in confederation for Manitoba.*

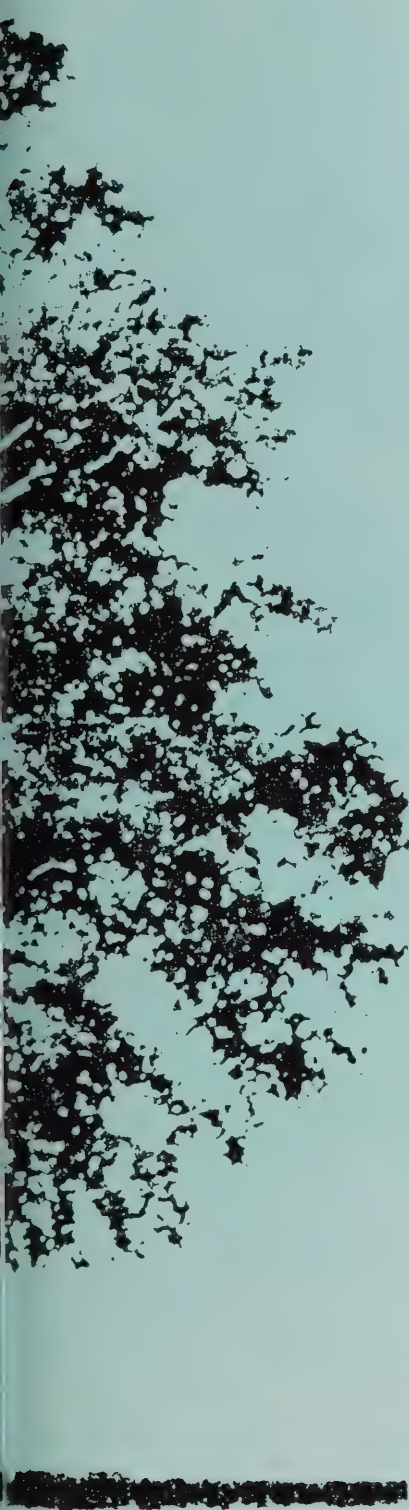


# the right tree in the right place

by Lois Lane







One of the worst recorded ice storms ripped through Southern Ontario 20 months ago bringing traffic to a standstill and leaving literally thousands of homes and factories without power.

Ice-laden branches splintered away from trees. Entire trees toppled, taking power lines with them. Toronto Hydro crews, weary through lack of sleep and stiff with cold, at one time struggled to restore power to 10,000 customers. London PUC had an estimated 30,000 stricken customers and the total number of homes throughout the province without light and heat will probably never be known.

Emergencies like this painfully underline the fact that tall trees and power lines just don't mix. No one is more aware of this than Ontario Hydro's forestry department, but the answers won't come overnight.

Last year it cost Hydro \$4,100,000 to prune or remove 814,000 trees along 15,000 miles of line. Chief Forester Jack Winter feels this sum could be drastically reduced if careful forest management is applied.

"One of our aims is to see a replanting program carried out with trees compatible with our particular heights of lines," Mr. Winter says. "There has been a significant surge of planting in the province recently, partially sparked by the devastation caused by Dutch

elm disease and by the loss of various species for other reasons."

Statistics indicate that in 1966 nearly 170,000 non-compatible trees (those whose growth is so rapid that branches are shooting through the lines in a few years) were planted by agencies and individuals along power lines. Twenty per cent of these will require pruning next year; the rest will require attention by 1975.

Hydro foresters believe that careful selection of the right tree for the right line, and the application of growth inhibitors, might cut their work considerably.

To put these theories to the test, the forestry department is establishing a demonstration tree farm at the site of Pickering nuclear power station, just east of Toronto. The farm will eventually be open to the public. One section of the 75-acre farm will be devoted to the compatible tree idea.

"To show other groups such as municipal Hydro systems what we mean about compatible trees, we have planted horticultural native and non-native varieties and will string conductors over them at four typical heights," says District Forester Earl Gillespie.

"One variety includes the Norway maple, which was developed for its shape. This tree will grow up, but not out. Other species include flowering crab, hawthorne, little leaf linden, birch, ironwood and hawthorne. Most



*Woodman, plant that tree.  
In goes another sapling at the  
demonstration tree farm at  
Pickering power station.  
Other photos show pruning  
necessitated by oversize  
specimens.*







These trees would be extremely valuable in towns and cities where replacement is a major operation. For example, Peterborough alone will have to replace 40,000 dead elms."

Forestry officials hope that nurseries can stock up on these varieties.

However, compatible trees will not be the only experiment at the farm. Growth-inhibiting chemicals will also be field-tested there. "We hope to have a technique working on an operational basis by 1971," Mr. Winter says, adding that the work will be done in cooperation with Ontario Hydro's research laboratories.

About 8,000 trees including such species as maple and black locust will be used in the experiment. Inhibitors will either slow down the growth of trees and eventually stop it completely.

Twenty-two commercially available chemicals will be tested by spraying, dipping or application to a wound. When some trees such as poplar, cherry or willow are pruned, the severed portion will send off shoots in greater profusion than before. Hydro's forestry experts propose to dress these wounds with a growth inhibitor and see what happens.

Herbicides are being used extensively in the United States by Ohio Power, Pennsylvania Electric, Georgia Power and other large utilities without any apparent problems of toxicity. A

reduction in growth of between 40 and 60 per cent has been reported, with some pruning cycles lengthened by one year.

Grass retardation is also being studied. "We have lots of grass to mow each year along the rights of way, especially around large metropolitan centres like Toronto," says Dick McPhail, another district forester. The tree farm will also be used to carry out development programs on new herbicides, insecticides and soil sterilants.

Improvements in herbicide spraying are already being made across the province. Since 1951, Hydro has found that the spraying by helicopter of vegetation along remote lines is the most economical and practical way of line-clearing. One problem with this type of application has been wind drift although this will be reduced by a new attachment on the helicopter.

Now herbicide will be fed into a 26-foot long microfoil spray boom equipped with 52 nozzles. Droplets sprayed from the boom are uniform in size, big enough to eliminate drift and offer better coverage. This summer 6,000 acres in the Terrace Bay, Port Arthur and Kenora areas were sprayed in this manner.

Brush control has always been thought of in terms of liquid chemicals, but this year, chemicals in the form of pellets were released from a helicopter on 10 miles of line near Marathon.

"The chemical enters the soil when it rains and subsequently is picked up by growth in the area," explains Mr. McPhail. "We hope this method will give us better control in areas where the pilot has to fly over 180-foot high tower lines."

But the Hydro forester's job is not just one of spraying, chopping, pruning and cutting. Reforestation has continued at a steady pace since the department was first formed in 1931. Ontario Hydro owns 120,000 acres of land which is available for forest management purposes. By the end of this year, about 2,000 acres will have been planted with trees in a continuing reforestation program.

All this work calls for a sizeable staff. Hydro's forestry department ranks in size with the Tennessee Valley Authority's forestry staff in the United States. Tree management is a highly specialized field and each year Hydro's forestry recruits enter a training program regarded as outstanding by major utilities in North America. Training takes place at the Conference and Development Centre at Orangeville.

It all adds up to a province-wide effort to preserve one of our most important natural resources. And have the right tree in the right place. □



# isotopes key to a better world

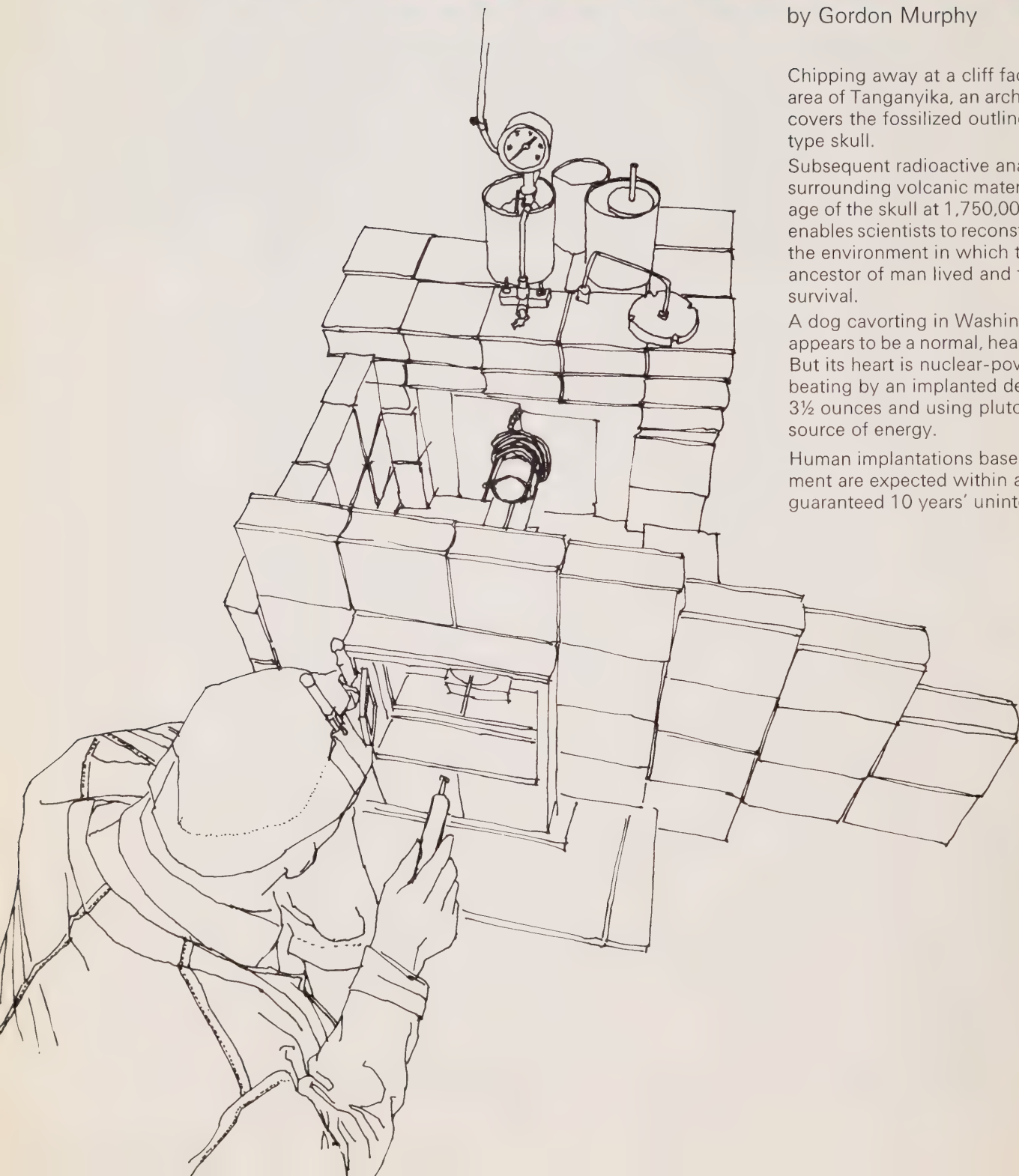
by Gordon Murphy

Chipping away at a cliff face in a remote area of Tanganyika, an archeologist uncovers the fossilized outline of a human type skull.

Subsequent radioactive analysis of the surrounding volcanic material places the age of the skull at 1,750,000 years and enables scientists to reconstruct a picture of the environment in which this ancient ancestor of man lived and fought for survival.

A dog cavorting in Washington, D.C., appears to be a normal, healthy animal. But its heart is nuclear-powered, kept beating by an implanted device weighing 3½ ounces and using plutonium as its source of energy.

Human implantations based on the experiment are expected within a year. With guaranteed 10 years' uninterrupted





performance, the device represents a major advance over today's battery-powered pacemakers, which last a maximum of three years.

Back to home, a collection of ancient Egyptian silver coins is irradiated by being placed in a polyethylene bag and immersed in water surrounding the core of the clear reactor at McMaster University Hamilton, Ontario, the only university in Canada with such equipment. Later, the length and duration of gamma rays emitted by the coins are measured to indicate what metals they contain.

One of the subjects of the study — final conclusions have still to be drawn — is to obtain information about the economic situation in Egypt between 184 BC and 42 BC, a period in which other metals were added to silver coins. The assumption is that economic conditions dictated, much as they do today, what was added and in what quantities.

These are but a few of the accomplishments of radioisotopes, many types of which are produced by Atomic Energy of Canada Limited's nuclear reactors at Chalk River in what has all the potential of becoming a multi-million dollar industry.

Far from releasing vast quantities of heat that can be converted into power, nuclear reactors may also be used to bombard an element with neutrons to produce a radioactive isotope of the same or some other element.

Canada stands 26th among the nations of the world in terms of population. Thanks largely to the accomplishments of AECL, she is recognized as being among the first five in developing peaceful uses of atomic energy. High on the list is the production of radioactive isotopes and related equipment for use in industry, medicine and agriculture.

One of the many and varied applications of radioisotopes, their potential in solving the basic problems of agricultural production and distribution could be most important. The ability to increase food production by the irradiation of seeds before planting, the production of new plant varieties, the con-



*Radioactive isotopes are handled by remote control in the Commercial Products laboratory of Atomic Energy of Canada Limited.*

trol and elimination of insect pests that plague crops and infest stored food — these and many other benefits are already here or in the offing.

"Scientific food preservation is an attractive method of increasing world food supplies, particularly in the developing countries of Asia, Africa and Latin America where losses due to spoilage are estimated at up to 50 per cent," says K. F. MacQueen, a scientist attached to AECL's commercial products section. "If this great spoilage of food could be reduced by even one-third, then millions of hungry or malnourished people could be fed."

Irradiation of food may well be commonplace within a few years, particularly in the developing nations. Reduced to its simplest terms, it is just another treatment like cooking or fermentation.

The treatment of food by radiation is currently carried out on three levels: sterilization, pasteurization and plant stimulation. Sterilization requires relatively high doses of radiation, but ensures the complete destruction of all bacteria. If suitably packaged before irradiation, the product will remain fresh indefinitely.

United States Army volunteers have eaten sterilized bacon stored for more than a year at room temperature and have been unable to tell the irradiated item from



fresh. Similar results have been recorded with more than 20 other common foods.

Pasteurization requires only low-level exposure — enough to destroy a high percentage of the bacteria present and increase significantly the shelf-life of the product. The process could be a big factor in the domestic marketing of fresh fish, which could be cheaply irradiated and shipped to the central Canadian market in chilled condition instead of being expensively deep-frozen.

Plant stimulation is a process in which seeds are given low doses of gamma radiation to produce earlier and greater yields. Still in the experimental stages, this technique may well prove to have enormous commercial potential.

Irradiated foods undergo more extensive tests in Canada for safety and wholesomeness than any other kind of food. The Food and Drug Directorate approved irradiation of potatoes in 1960 to inhibit sprouting, and thus became the first health department in the world to permit the sale of irradiated food for human consumption. Onions followed, and the expectation is that fish, fruit, wheat and a variety of other foods will soon be added to the list.

"With Canada's short growing season, long shipping distances and a significant export business, any technique which will extend product shelf-life will not only make more orderly distribution possible but can open up new markets previously beyond the range of good quality produce," says Dr. A. B. Lillie, commercial products research chief at AECL.

Canada being one of the world's leaders in agriculture, it is appropriate that the first commercial food irradiator was designed and built by AECL. More than 200 irradiators bearing the AECL stamp and using Cobalt-60 isotopes produced at Chalk River are now operating in 33 countries. Fifty other countries are reportedly studying the advantages of food irradiation.

Another first that brought wide attention to Chalk River was the production in 1951 on a commercial scale of a cancer therapy

unit. More than 700 of these units are now bringing relief to more than a million patients a year in more than 50 countries.

While public attention has been largely focused on the therapeutic value of radioisotopes in medicine, recent developments have proven they are extremely valuable in diagnosis. Modern medicine is increasingly dependent on them for identification and study of diseases. For instance, the tagging of pharmaceutical compounds with tracer amounts of radioactive elements makes it possible to follow the dose throughout the body.

"Tracers" are equally valuable in locating malignancies such as brain tumors, and for tagging red blood cells to study their life cycle and volume.

Radioisotopes have made important contributions to medicine to date, but research is expected to magnify that role as those concerned with peaceful uses of atomic energy continue to press toward a better deal for humanity.

Certainly, Cobalt-60 appears to have a fantastic future as a low-power energy source for a variety of devices, particularly for unmanned instruments in remote locations. For instance, AECL has been working with the Department of Transport to perfect a buoy light that will warn vessels for extremely long periods without attention.

At the other end of the power scale, Cobalt-60 could take a nuclear spaceship to the moon, the planets or beyond.

However, while radioisotope use in medicine, education and research in Canada has been keeping pace with that in other countries, the same apparently does not apply to industrial applications. Results of a recent survey sponsored by the Canadian Nuclear Association indicate that industrial applications have far from reached their full potential.

With the exception of gauging (the use of radioactivity to regulate the thickness of a product), the survey shows that the employment of radioisotopes in Canadian industry has been very limited. Indeed, practically all the gauging equipment in use has been imported.

Lack of communications between research establishments and industry is cited as a contributory cause. The report says that although this country has been a leader in the production of very high energy sources for massive irradiation in industrial processes, and has supplied many specially-designed irradiators to other countries, irradiation in food processing in Canada has been negligible and its use in the sterilization of medical products limited.

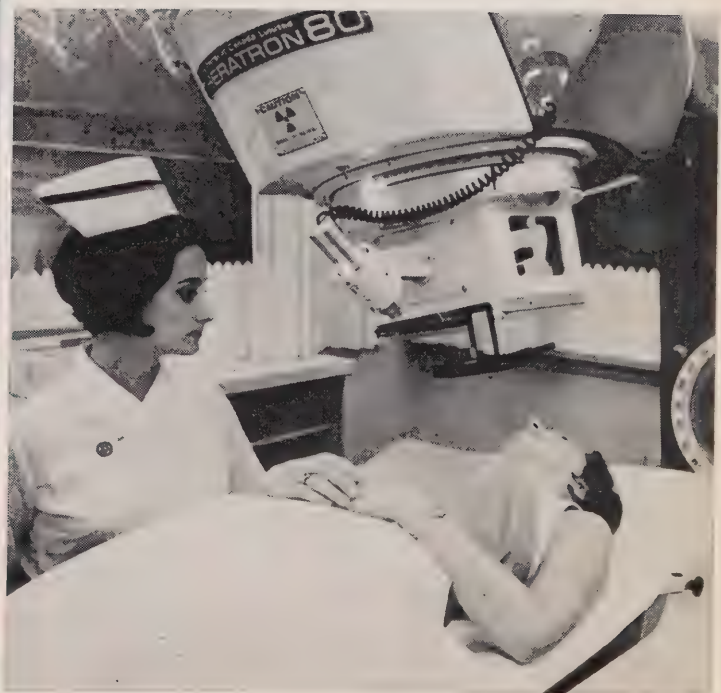
The advantage of sterilizing drugs and medical disposables such as hypodermic needles and swabs by irradiation is that it is not essential to produce them under sterile conditions. Sterilization can be performed as the final stage after packaging. Within the next year, three sterilization units designed and built by AECL will be opened in Denmark, Czechoslovakia and the United States.

In addition, there is a vast potential market for the sterilization of all hospital equipment, from bedding to nurses' uniforms. Such a unit is being installed in the new University Hospital in London, Ontario, gaining a world first for Canada and AECL.

The CNA's conclusion that this country nevertheless lags in the industrial use of radioisotopes appears to be borne out by AECL statistics. Revenue from the sale of isotopes, equipment and related services exceeded \$9,300,000 during 1967-68. Ninety per cent of these goods went outside Canada. □



AECL technicians test equipment for remotely handling water-shielded cobalt-60 used in industry for material sterilization. Cobalt pellets destined for treatment of cancer patients are first irradiated in a reactor. Over 700 AECL cancer therapy machines employing the pellets are in use around the globe.

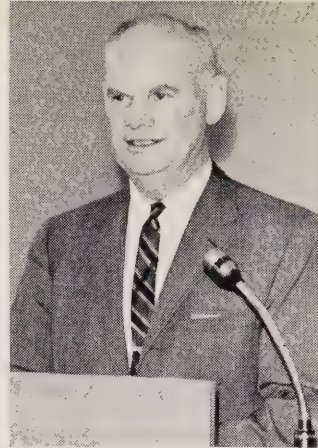




# the squeeze goes on



**John Middel**  
*Regional government now*



**Fergus Mallon**  
*Hard times ahead*



**Harold Banks**  
*Is expenditure necessary?*

Municipal financing will remain difficult over the near term, Fergus P. Mallon, manager of the municipal department of a leading investment firm, told District 5 OMEA delegates at their summer meeting at Delhi.

Mr. Mallon attributed the present financial situation partly to a substantial increase in the demand for capital, which began in 1961. But the local picture must also be related to conditions outside Canada, particularly in the United States.

"Changes in Canadian interest rates have been strongly affected by movements of similar rates in other countries, especially in the United States, and the need to maintain differentials that protect the necessary movement of capital in and out of the country. As a result, the flexibility of Canadian monetary and fiscal policies has been decreased, and Canadian rates have probably been pushed higher than if they were wholly related to domestic considerations," he said.

Mr. Mallon said a basic reason why interest rates had risen to such high levels was the belief of investors that the purchasing power of money would continue to decline. For this reason they were increasingly reluctant to purchase long-term bonds, even at progressively higher levels.

Harold Banks, Ontario Hydro's assistant general manager — finance, told delegates that a fundamental of good planning was to firmly establish the need for an expenditure. This applied to both capital and maintenance costs.

"Full evaluation of all major future expenditures will give a basis for ranking the various projects and deciding which are most essential and bring the greatest benefits, and those which produce the least," he said. "When the related financing program is worked out, this ranking process will provide the basis for cutting off those projects which cannot be currently financed."

Mr. Banks said that 78 per cent of the cash requirements of the municipal utilities was raised internally through rates in 1968. This proportion was good under present circumstances, but it should not preclude utilities from striving to build an even



*Ray Pfaff, manager of St. Catharines PUC, offers best wishes to Ontario Hydro Vice-Chairman D. P. Cliff, who broke the news of his impending retirement from Hydro at the District 5 meeting.*

greater amount of their capital plant from power revenues.

He added that Ontario Hydro was considering a proposal to permit utilities to invest surplus cash in bonds of other municipalities as an alternative to Canada or provincial bonds, as required by existing legislation.

Speaking on the progress of COMPEC, a co-operative marketing plan in Essex County, Al Steeles, Ontario Hydro area sales and service supervisor, said the consortium of 13 municipal utilities was considering the bulk purchase of conductors, transformers, water heaters and other materials. "We feel that our combined purchasing power should give us a more attractive price in this day of rising costs," he added.

Mr. Steeles said that, depending on a study by Ontario Hydro, all the utilities in COMPEC might raise their distribution systems to 27,600 volts.

Another hidden benefit of the plan had

revealed itself during dealings with county school boards. "We find that the boards prefer to funnel their requests through a central point rather than through 13, as it would be in our case."

John Middel, manager of Harrow Hydro, one of the participating utilities, said that the plan was really a form of regional government.

"It has been said that Essex County will probably be one of the last areas to form a regional government. But as you have heard, we have regional government now without interference from the government, and we still have all our commissioners," he added.

Presenting a report on regional government developments, Andy Frame, of Burlington, said that task forces had been set up to study what form Hydro should take in the proposed Niagara region and Haldimand-Norfolk region. Other task forces would likely be established as the need arose.



# along hydro lines

## Thunder Bay commissioners

Five members of the Hydro Electric Commission of Thunder Bay have been named. The appointments are for a three-year term beginning January 1, 1970, when the cities of Port Arthur and Fort William along with neighboring townships become one regional municipality.

Mayor Saul Laskin, of Port Arthur, who was chosen to head the new municipality in a June 23 vote, is an ex-officio member. Appointed by the new council were W. H. Spicer and W. W. Laakso. Ontario Hydro named James Currie and L. E. Danis. The appointments were made as part of Bill 118 which incorporated the City of Thunder Bay.

All the members have had previous municipal experience. Danis and Mr. Spicer are presently serving on the Fort William Commission. Mr. Currie is serving on Port Arthur PUC while Laakso is a former municipal councillor.

In 1972, Thunder Bay council will decide whether subsequent commissions will be appointed or elected. □

## Bursting seams

Ontario Hydro's Conference and Development Centre near Orillia has been in use about 20 months, and already it's small.

At the moment, the 93-bedroom centre is operating at 160 per cent of its capacity with overflow students billeted in area motels. If estimates prove out, this figure will reach 200 per cent by the end of 1969.

Now Hydro has approved plans for a self-contained addition, which will more than double the centre's size. The expansion scheme will include two residential buildings, a service administration building, extra trade and technical training facilities including lecture rooms and laboratories, a larger parking lot and a new road. On completion, the centre will be able to accommodate 200 students. Construction will start this year. □

## New names

Nine districts of the Association of Municipal Electrical Engineers have held their annual meetings and elected new men to their groups. Listed are the presidents and secretaries: District 1 (Eastern), H. Moodie, Kingston; S. J. Dixon, Eastern Region, Ontario Hydro. District 2 (Georgian Bay), W. E. Robbins, Orillia; J. B. Morrison, Georgian Bay Region, Ontario Hydro. District 3 (Thunder Bay), M. H. Kelly, Atikokan; C. M. Nicolson, Port Arthur. District 4 (Central), R. H. Lamb, Oakville; A. M. E. Ford, Scarborough. District 5 (Niagara), J. S. Wilson, Welland; A. R. Turton, Welland. District 6 (Grand Valley),

W. Boyle, Preston; R. J. Boussey, Clinton. District 7 (London), T. A. Gagen, London; K. C. Gerhard, Western Region, Ontario Hydro. District 8 (St. Clair), J. L. Sanger, Kingsville; R. A. Holliday, Western Region, Ontario Hydro. District 9 (Northland), D. Dowds, Sudbury; G. B. Stroud, Northeastern Region, Ontario Hydro. □

## Quick thinking

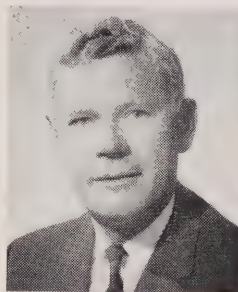
Helen Ames, a grade eight student at Cottam, near Windsor, has received a citation from Ontario Hydro Chairman George Gathercole for her "great presence of mind" in preventing a possible tragedy. The presentation was made at a school assembly by Al Steels, Essex Area sales and service supervisor.

Helen was listening to a record player with two friends. Unknown to them the playing arm short-circuited. One of the girls touched the machine and put her other hand on a metal sink. She was unable to let go. Her friend tried to pull her away and was also paralysed by the charge. Helen realized that she couldn't touch the two girls and unplugged the machine before rendering aid.

"We felt this act should not go unnoticed," said principal Shannon Olsen, of Gosfield North Township Central School.

Hydro agreed, and the chairman's citation, the first to a private citizen, was the result. □

## New director



E. G. Bainbridge

E. Grant Bainbridge has been appointed director of Consumer Service for Ontario Hydro. He succeeds George R. Currie, who has moved to London as Western Region manager.

Mr. Bainbridge joined Hydro in 1940 after graduation from the University of Toronto with an electrical engineering degree. He spent a number of years in consumer service work, both at Head Office and in the regions, and was appointed municipal service engineer in 1959. Four years later he was assigned to the Volta River Authority in Ghana to initiate rate systems. He returned to his municipal service position in 1965 and was appointed consumer service and sales engineer for Central Region in 1968.

Succeeding Mr. Bainbridge in Central Region is G. D. Robertson. An engineering and business graduate of the University of Toronto, Mr. Robertson has had wide consumer service experience during his 18 years with Hydro. For the past 10 years he has been a consumer service superintendent in Central Region. □

## DC does it

A study of direct current transmission of high-voltage power is being undertaken by Canadian Westinghouse. Costing about \$250,000, the technical and economic feasibility study will be financed jointly by the company and the Canadian government's Department of Industry program for the advancement of industrial technology in Canada.

"There are, at present, 10 direct current transmission projects in existence or being planned in the western world, including two in Canada," said James Newell, vice-president in charge of Westinghouse's power apparatus group. "In none of these important undertakings, however, are products of Canadian technology to be found."

DC transmission over long distances and at high voltages offers considerable advantages over alternating current systems now in general use. It also allows the transfer of power from system to



system without synchronization. Only in the past 15 years or so has equipment been developed to allow the commercial exploitation of direct current transmission.

The company estimates the Canadian market for DC transmission apparatus could reach \$200 million in the next decade. □

## Nuclear envoys

Ontario Hydro and the Kernkraftwerk-Betriebsgesellschaft MBH utility in West Germany are exchanging nuclear "diplomats" this year to learn more about each other's operations.

The German envoy, from the MZFR nuclear power station at Karlsruhe, is already here. Thomas Olles, assistant production superintendent, arrived at Douglas Point nuclear station in January. He will spend about a year there.

The Hydro half of the exchange, George Williams, production superintendent at Douglas Point, left in August to join the German operations staff. Mr. Williams' assignment is for two years.

Canada and Germany are anxious to exchange experience in the operation of heavy water-moderated reactors. The MZFR station is a 50,000-watt nuclear station. It employs a heavy water moderated and cooled reactor of the pressure vessel type. □

## CNE 69

After years of going it alone, Toronto and Ontario Hydros were joined by other utilities in the Better Living Centre at this year's Canadian National Exhibition.

Utilities for the boroughs of Metropolitan Toronto — East York, Etobicoke, North York, Scarborough and York — joined Toronto Hydro last month in presenting fashions in clothes and appliances in the Hydro theatre. Entitled "Holiday in Hawaii," the show had a leisurely pace, liberal doses of the hoola and drew plenty of attention from both sexes.

George Exley, of Toronto Hydro, headed the committee of utility people that put on the show. He said that in the last few years examination of tickets (there's always a draw) filled out by



*Thrills and frills*



visitors showed a large percentage came from the boroughs of Metro. The cost of putting on this year's show was split among the utilities according to the number of customers. With comments by Darlene Lang, the show featured over 50 different outfits. Ontario Hydro moved from the south to the north of the building — almost on the front porch — and came up with a completely new exhibit. Highlighted by plastic module displays that carried color transparencies of power people at work, the area bustled with activity.

Visitors could watch an on-stage demonstration of a Van Graaff machine for generating static electricity. A helicopter was available for junior birdmen to get the feel of flight. There were opportunities to compete against an electric pump with a hand pump, pedal a closed-circuit television receiver into life and watch chicks hatching electrically.

## Rot not

Like the song says, "Everything's plastic". Even the power poles, almost exclusively wooden for decades — isn't sacred anymore.

A Swedish firm has come up with poles consisting of a half-inch plastic casing reinforced in the centre with glass fibre. A cut in labor costs of as much as 45 per cent is foreseen. One man can do the installation because a 33-foot pole weighs only 55 pounds.

Maintenance costs should also be lower, says the developer. The poles are unaffected by heat or cold and impervious to rot or fungus.

## municipal briefs

**Newmarket Hydro** is among the latest utilities to install a new transformer station and step up the local distribution voltage. Manager Jim Beadle says power received from Ontario Hydro at 44,000 volts is now being stepped down to 13,800 volts as the town gradually changes over from the old 4,000-volt system. Up to four times the former load can be carried at the new voltage. **For North Bay Hydro** to connect up another customer does not sound anything out of the ordinary, but this summer a special connection did take place. Eighty-one-year-old Granny Irwin went electric. Mrs. Isaac Irwin had her 100-year-old farmhouse at Carmichael's Corners — a small community inside Ontario's largest city — wired for electricity. To mark the occasion, her grandson Irwin Prescott, a local musician, arranged an electric shower complete with eight bands. Most of the folks in the neighborhood dropped in.

**Hensall PUC** has a new manager. Lorne Archer, of Wingham, replaces Harry Page, who has moved to Wingham as PUC manager. Mr. Archer worked 12 years for Wingham PUC and then for Ontario Hydro.

**Teachers** went back to school this year at Ontario Hydro's Cerise Region office in Willowdale. A group of 35 from Metro Toronto and the surrounding communities of Mississauga, Stouffville, Streetsville, Port Credit, Whitby, Bowmanville, Ajax, Brampton and Brampton took a "cram" course in residential heating wiring. The graduates are now qualified to teach these subjects in their high schools.

**Mrs. W. R. Mathieson**, wife of AMEU secretary-manager I. Mathieson, has been appointed chairman of the Volunteer Nursing Services Committee for the Canadian Red Cross in Toronto. A graduate of the University of Western Ontario in Nursing Science, she worked for Ontario Hydro from 1943 to 1952. Mrs. Mathieson has been active in the Red Cross since 1950.



**J. R. (Bill) Stewart**, who devoted 60 of his 85 years to Hydro in North Bay, has died. His whole working life was aimed at the establishment and continuing development of electrical service to the city.

Born near Renfrew, Mr. Stewart moved to North Bay in 1906 and went to work for the North Bay Light, Heat and Power Company in an era of carbon filament street lamps that gave off more heat than light and were turned on only if the night was moonless. In 1916, when Ontario Hydro bought the Light Company, Mr. Stewart stayed on. And in 1940, when the city of North Bay purchased the system, he joined the local utility. He retired as manager in 1949.

After returning to the North Bay job in 1951 and 1952 for a few months, Mr. Stewart turned his efforts toward the establishment of a local utility in suburban West Ferris. In 1954 he became its first chairman and served on that commission until January 1, 1968, when the township amalgamated with North Bay. In the 1930s he served West Ferris as both reeve and councillor.

**Stowel PUC** was recently on the receiving end of a certificate of merit from the Electrical Utilities Safety Association. The certificate recognized a decade free of compensable accidents for the utility's workers. At the same time, outside men received hard hat decals denoting their individual records. Included were: Joseph Marshall, 23 years; foreman Bob Helmka, 18 years; Bruce Dubrick, 14 years; Gerald Douglas, four years, and Gordon Timmers, two years. PUC Chairman E. M. Creighton presented the decals.

**Bruce Crooke**, who was superintendent of Victoria Harbour Hydro for 39 years, has died. Mr. Crooke, a former member of the local public school board, retired in 1965.

**Portrait** of Sir Adam Beck, father of Ontario Hydro, now hangs on the wall of the London PUC boardroom. Sir Adam made many of the initial decisions concerning public power in his adopted city of London. The 54 by 35-inch canvas was given to the PUC by the London Public Library and Art Museum. Painted in Ottawa in 1909 by Sir Oswald Birley, it shows Sir Adam wearing a top hat and carrying a top hat and cane. Restoration work was done by Mervyn Ruggles in Ottawa.

**Computerizing** cautiously has paid off for Oakville PUC. Last March, a study recommended immediate transfer of billing and associated functions to the new IBM service bureau in Hamilton. With commission acceptance, IBM began to work out the program. But J. A. Porter, PUC treasurer, said the staff was cautious in its approach to the conversion. "We did the billing manually as usual and compared our results with IBM. I'm glad we did because we found a lot of mistakes and with the duplicate billing we could see where the computer went wrong."

**Twenty-seven years** of service with Kitchener PUC has come to a close for Howard Becker, secretary-treasurer since 1965. He was honored at a dinner with 200 staff members attending. Paying tribute to Mr. Becker, general manager A. J. Thaler said he had figured many worthwhile changes in the accounting section and had helped improve the PUC's financial picture. Mr. Becker began his career with the utility in 1922.

**When Alma Wilson** joined Burlington PUC there were only 3,000 people in the town and the commission didn't even handle electricity — only water. That was 41 years ago. Over the intervening years, Miss Wilson, who retired recently as secretary to general manager and assistant secretary to the commission, has seen the city's population grow to about 80,000 people with 100,000 water customers and 20,000 Hydro customers.

During her career, she says, she "did almost every job there is." She moved five times with the utility, from a building which used to be a school and where the town hall is now to the present building on Market Street. At a dinner-dance in her honor, Miss Wilson received a watch, a set of luggage and a travel clock. More than 150 people attended.

**Lorne G. Powell**, who served Stratford PUC for 36 years, has retired. His first quarter-century was as superintendent of the electrical and water departments and he later became manager of operations, the position from which he retired.

**The Orillia Water, Light and Power Commission** happily gave two employees \$500 but felt that a court decision was not harsh enough. A reward of \$1,000 had been offered by the utility for action leading to the arrest and conviction of anyone shooting at insulators. While off-duty, employees Keith Smitham and Maurice McMillan discovered a man doing just that near Swift Rapids generating station. The man was eventually convicted of willful damage, but received only a small fine.

**A. S. Dobronyi** has been elected 1969-1970 chairman of the London chapter of the Association of Professional Engineers of Ontario. He is manager of engineering for London PUC. □

## First step



*On the move*

Not all of the family has moved in and it won't for some time, but Kingston PUC is now occupying its new home. As a first step, employees of the utility's electrical, water and gas departments have transferred from their downtown quarters to the new \$800,000 service centre on Counter Street.

The next step will occur in another two or three years with the construction of an administration building at an estimated cost of \$1,000,000. It will be linked to the present structure. Only the transit department will remain downtown.

Not one to let an ideal public relations opportunity go to waste, the PUC staged an open house after the three departments were settled into the one-storey service centre. The first evening drew 1,700 visitors and the second topped that mark. All sections of the PUC staged displays together with the local Fire Department and the Electrical Utilities Safety Association. A hard-cover brochure helped to explain the new premises to visitors.

Located on a 15-acre site purchased three years ago, the service centre has a total area of 38,600 square feet. Most of it is split equally into garage, workshop and warehouse space with the balance for an office and lunch room. □

## A good year

Ontario Hydro hit an all-time low for accidents in 1968, and although it wasn't absolute zero it does stand out from other years. Warren Clifton, in his yearly report as Accident Prevention director, noted that "for the first time, a full year has been completed with only one fatal accident among our work force."

The report showed that last year nearly 20,000 full-time employees worked more than 38,000,000 man-hours. During that time, 435 disabling injuries were incurred.

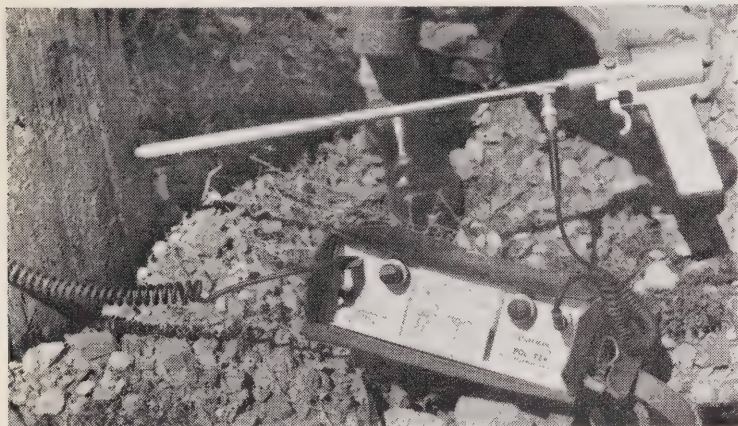
"Two other all-time lows were achieved during 1968. The disabling injury severity rate (number of days lost per million man-hours worked) was 900 compared with the previous low of 1,100



days. The 1968 recordable motor vehicle accident rate was nine accidents per million miles driven compared with the previous low of 10," Mr. Clifton stated.

One off-key note was sounded. The disabling injury frequency (number of injuries per million hours worked) moved up from nine in 1967 to 11 in 1968. □

## Soundness sounded



*Listening in*

"Rotten to the core" is more than a derogatory expression to Ontario Hydro's line maintenance department — it means problems.

So the department is always in search of new and improved methods of getting to the core of wood poles to test their strength. In recent years, two methods have been primarily used. One is the regular brace and bit used to drill into the pole to find hollow spots; the other is to use a hollow bit to extract core samples. Both are sure but slow.

Lately, a sonic pole tester has been put through extensive field tests. The new equipment cuts testing time by 90 per cent since there's no drilling and little excavating required.

Two probes, one a transmitter the other a receiver, are placed on opposite sides of the pole six inches below the ground line. Sound waves are emitted by the transmitter and picked up on the other side. A good reading means a solid pole; a bad means a hollow spot, since the waves travel slower through air than wood.

If there's a bad reading, the pole is then checked out by more conventional means since the sonic equipment can't evaluate a pole's strength. Many eastern cedar poles in service for up to 50 years have hollow cores but are still serviceable. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Few things are quite so disturbing as unwelcome news and unexpected emergencies. To a municipal utility official, this may take the form of a fatal employee accident. But the surprise should not be allowed to displace good judgment in handling the community relations aspects of such a story.

Although there may frequently be a personal involvement as well as an administrative responsibility to be faced, it is well to have an emergency plan well established and well understood by everyone who may become involved.

How to handle such unwelcome news was one of the subjects

discussed by delegates to the third annual public relations workshop held in Toronto recently. Attending were members of district public relations committees from as far afield as Windsor, Pelee Island, William, and Nepean Township, near Ottawa. Once each year this representative group of electrical utility commissioners and managers meets to review PR objectives, exchange ideas and develop new techniques to help each local utility better serve its customers. Their conclusion on handling emergencies, for example, will be developed and made available to every electrical utility in Ontario.

\* \* \*

Sixty days sounds like a jail sentence, but wise utilities are giving that amount of warning when rates rise. Customers may be easily confused about the timing of the increase because Ontario municipal utilities bill on a two-month cycle.

Recent experience suggests that a local utility should alert its customers to the possibility of a rate increase as soon as possible. Most other consumer items like gasoline and food are paid for before consumption, and price increases are immediately apparent. Electrical energy suppliers, with their bill after consumption, must make special efforts to keep customers informed and content.

\* \* \*

Employees are important contributors to the reputation of an organization that directly serves the public. Their conversations and their opinions can influence the customer they see during the day, and the neighbor they see during the evening. It makes sense to encourage everyone in the organization to practise good public relations on behalf of the employer.

Sometimes though, the reasons for practising good PR are not made clear and the employee, like all of us, makes only passive gestures because he does not understand the need for active participation. In an effort to overcome this, North Bay Hydro recently distributed a memo to staff which outlined the reasons and pinpointed specific benefits which they hope to achieve.

Among the points mentioned were:

- A good PR program will enable North Bay Hydro to overcome some public criticism of the concept of elected commissioners.
- A good PR program will help the utility make necessary rate changes with a minimum of difficulty.
- A good PR program will sell a good image which, in turn, will sell Hydro. A good PR program is a silent salesman.
- How much should be spent on PR? A great deal of PR is free. In fact, it is difficult to buy PR. It will come through the activities of staff and their attitude toward people.
- How does a good PR program affect policy? All policy is conceived and adopted to make an orderly operation so that each customer gets equal and fair treatment. Each customer, large and small, is important.

- Who is responsible for PR? You are.

## July energy production

Primary energy provided by Ontario Hydro in July totalled 4.52 billion kilowatt-hours, an increase of 7.4 per cent over the same month a year ago.

For the first 7 months of 1969, the total is 34.55 billion kilowatt-hours, up 7.7 per cent over the same period last year.

Adjusted for seasonal influences, primary energy demand in July was 5.02 billion kilowatt-hours, 1.96 per cent more than the previous month.

The seasonally adjusted total for July represents 60.28 billion kilowatt-hours at annual rates. This is 433.31 per cent of the energy demand in 1949. □





## as don wright sees it

With the great die-hard exposition still making apples down Montreal way, it is encouraging to find our own modest fairs and exhibitions able to carry on with their heads above the financial water and unsupported by the weary taxpayer. Last count there were more than 230 such end-of-summer extravaganzas scheduled for town and hamlet across the province – a tribute to the folk who can still dig a prize pumpkin, the fragrance of fall flowers and the more pungent aroma of steaks, chops and bacon on the hoof.

Honors for the oldest go to Williamstown, a tiny hamlet near Cornwall in Eastern Ontario, where they declared their first winner in the headcheese section way back in 1814. That was just the year after Laura Secord led her cow through the American lines to warn the British of an impending attack and it might just be that she carried on to Williamstown and a red ribbon in the holstein division.

Granddaddy of them all, in terms of girth if not age, the Canadian National Exhibition recently closed its gates on its 91st consecutive performance and while attendance figures were off, the 1969 version managed to break even financially. This in itself is a major achievement and kudos are due to the board of directors, presided over this year by the very capable Oakah Jones who is now president of Consumers' Gas Company. One traditional feature many did miss at this year's show was Electrical Day. It was renamed Energy for Better Living Day – no doubt to compass all the other important sources of power such as oil, coal, gasoline and wood.

One problem common to most utilities is the slump in electrical consumption which occurs during the long hours of darkness when most good burghers are either asleep or engaged in activities they are able to perform without electrical assistance. North Bay Hydro thinks it may have the answer and is now working out the kinks.

They got the cue this summer from their own fathers. These busy little tattletales were quick to reflect the activities of a phantom prowler who made headlines after breaking into dozens of houses in the sprawling northern city.

Let there be light" was the reaction of the nervous citizenry and the electrical load soared over 1,000 kilowatts on the night following the newspaper story.

Convinced that crime can indeed be profitable, the local utility is considering the services of at least one full-time prowler. Wages, uniforms and union status remain to be finalized.

■ Ontario Hydro, on the other hand, is studying the feasibility of launching its own space program. Primary demand was about 110,000 kilowatts higher than normal during the period when Neil Armstrong and company were cavorting on the moon. Energy equivalent to the full output of a good sized generating station was required to accommodate the hundreds of thousands of people in the province who accompanied the astronauts via television.

■ At considerable risk to the editorial neck, we are going to suggest at this point that even electricity and the systems that supply it are not yet quite perfect. And when the power does go off, it sometimes does so under embarrassing circumstances. Like the recent power interruption which blacked out sections of Englehart, in Northeastern Ontario, last month. Among the victims was the Palace Theatre where the Saturday night audience was enjoying a feature entitled: "Where were you when the lights went out?"

And electricity was to blame for snapping Agatha Christie's Mousetrap for the first time in nearly 17 years. Fire and explosion in a London substation were responsible for a one-performance cancellation of The Mousetrap – Britain's longest running play.

■ Continuing on dangerous ground, we will take just one more bite at the hand that feeds us by suggesting that the odd kink still remains in some of the latest electrical gadgets.

We have in mind the intriguing excuse proffered the other day by one of the Hydro gals upon arriving half an hour late for work.

"Sorry about that, boss," she went on to explain, "but I ran into a knotty problem this morning in trying to add diversity and improve load factor on the local electrical distribution system."

She was getting around to the fact that her electric comb had run amuck and that 30 minutes of family assistance was required before it could be extracted and the tresses restored to their full glory.

■ Like the blind men who envisioned an elephant as resembling anything from a rope to the side of a barn depending upon that part of the animal's anatomy they were able to touch – we all wear blinders where our "own thing" is involved.

Take the view of Britain's great new liner, the Queen Elizabeth II, as expressed by Beer in Canada – a frothy little newspaper produced by the national association of the brewing industry. Did they exclaim in amazement at the powerful turbines driving this mighty liner – or at its safety features, speed or passenger accommodation? No sir, they drew attention to her most outstanding feature thusly:

"The beer storage installation on the Queen Elizabeth II, with a capacity of 365 barrels, is more than three times as large as the bulk beer installation on the Queen Elizabeth, which had previously held the record for size."

At that, the figures are reassuring and should be kept in mind by anyone planning an ocean crossing.

■ It's a crazy mixed-up world. In England, thousands of Britons are getting free electric

stoves and heating units as cities and towns switch from gas to electricity in certain prefabricated high-rise apartment blocks. The move follows a disastrous explosion in which one of the blocks, built of concrete slabs without steel frames, collapsed like a stack of cards.

In Russia, housewives are being forced to switch from wood to gas for cooking and it sounds like a real bargain. They're being charged about 18 cents a month regardless of the amount used – generosity occasioned by the recent discovery of enormous natural gas deposits in western Siberia and elsewhere.

And in the State of Washington, the federal government built 21 homes in a remote Indian village – all equipped with the latest in electrical appliances. They forgot that the village was many miles removed from the nearest power line.

■ Frogs and their sex problems seldom make headlines, but their amphibious antics have been in the news twice of late. The first item, headed "Nuclear Engineers Foiled by Frog's Sex Problems," had to do with stringing a cable through a conduit and under a road at Douglas Point power project with the aid of a string tied to a mouse. This was only resorted to after a frog had failed to co-operate even when a second frog, presumably a female, had been placed at the other end of the pipe. The inference here is that there are some pretty mixed up frogs and we'll be surprised if less than a dozen budding psychologists miss this opportunity for a learned doctoral thesis.

The second instance of frogs refusing to go a-wooing in the interest of humanity occurred during an attempt to film their mating habits for the edification of public school students. A Canadian film company shot more than 10,000 feet of two frogs mating – but it wasn't easy.

Film crews stood by for two weeks trying to catch them in the act and it wasn't until a biology professor injected them with some kind of serum that the reluctant lovers co-operated.

The frogs are part of a series of sex education films to be shown in Canadian schools and they should make a refreshing switch from the birds and the bees. The next generation may not know much about history or geography, but they'll sure as heck know how a frog gets his kicks.

Why our educators feel obliged to avoid homo sapiens at all costs and to cast about anywhere from the amphibia to the crustacea in their search for safe sexual subjects is not entirely clear. We are reminded, though, of the classic remarks by the late Dr. Marcus Long at a Toronto Electric Club luncheon some time ago. Commenting on education, he said:

"The best way to get an education, I was told as a boy, is to spend an hour in the arms of an intelligent woman. You won't find that prescribed in most schools. Even courses in sex education make no provision for laboratory work."

And under the present system – perhaps it's just as well. Who needs to spend an hour in the arms of an intelligent newt or salamander?



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TORONTO 5

CNT

**Follow the leader?** Not likely. This recipe's not for cakes like mother used to make.

It's for a test batch of concrete. Perfecting the right consistency in the laboratory saves time and money on the job. That's partly why Ontario's electrical power rates are among the world's lowest — a real accomplishment in the present economic climate.





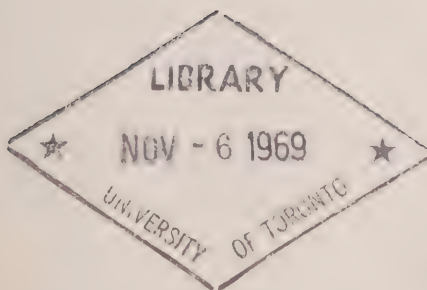
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- zap goes a million
- ebb and flow of tidal power
- the rise of superstack

## ontario hydro news

october/1969







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### the cover

A burst of high-voltage energy from a Tesla coil is just one of the attractions at Hydro's exhibit in the Ontario Science Centre, which opened officially last month. For story and photos, turn to page 14.

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## Double honors for Dundas



Robert J. Boyer



Ian F. McRae



J. Douglas Fleming

October saw a double distinction for Dundas, Ont. For the town that contributed Ontario Hydro Vice-Chairman D. P. Cliff, now retired after 24 years' association with the power business, has also yielded the newest member of the provincial commission, dentist J. Douglas Fleming.

Mr. Cliff's position as first vice-chairman has been filled by Robert J. Boyer, MPP for Muskoka, while Ian F. McRae becomes second vice-chairman, succeeding Mr. Boyer. Other members of the commission are Chairman George Gathercole and Commissioner Lt. Col. A. A. Kennedy.

Dr. Fleming has been a member of Dundas PUC for a dozen years. He has been chairman on several occasions and was president of the Ontario Municipal Electric Association in 1967-68. He is also chairman of the group's public relations committee.

It was 30 years ago that Dr. Fleming graduated in dentistry from the University of Toronto and set up practice in Dundas. He received an early indoctrination into the workings of public power from his father, the late Fred Fleming, who for many years was a commissioner in Waterford.

Apart from his PUC duties, Dr. Fleming has taken a keen interest in his community. He is a former assistant scoutmaster and a charter member of the Dundas Lions' Club. In addition to being president of the local club, he has served as a district governor, chairman of the board of governors for Ontario and Quebec and president of the Canadian Association of Lions' Clubs. He headed a Lions' committee responsible for a local senior citizens housing project.

Dr. Fleming's eldest daughter is taking her master's degree at the University of Western Ontario and his son is taking a master's degree at the University of Toronto. A younger daughter is in Grade 13.

Mr. Boyer was first appointed to the Ontario Hydro commission in November, 1962, as second vice-chairman. He has represented Muskoka district in the Ontario legislature since 1955, and is editor of the family-owned Bracebridge Herald-Gazette.

Mr. McRae was appointed a commissioner in 1966, a few months after retiring as chairman of Canadian General Electric Company. He is a member of the Ontario Economic Council, the Association of Professional Engineers of Ontario and the Engineering Institute of Canada. He is also a past president of the Canadian Nuclear Association and the Canadian Manufacturers' Association.



# The End of a Railwayman's Dream



Jim Etherington

*on Courtright envisioned forging a  
or international artery, but his dream  
d. Now a far different kind of steam  
er has arisen in the very village that  
s his name.*

20th century dream that failed to  
materialize is now part of a 20th century  
city on the banks of the St. Clair  
river south of Sarnia.

First wisps of steam from the  
foot stacks of Lambton Generating  
Station, Ontario Hydro's \$239 million

coal-fired plant near Courtright, are now  
spiraling into the skies. By the end of  
this year, the first two 500,000-kilowatt  
units will be on line with completion  
of the station's 2,000,000-kilowatt  
potential expected in 1970.

But one of the main transmission lines  
follows a ready-made path eastward on  
a former railway right-of-way that once  
promised riches.

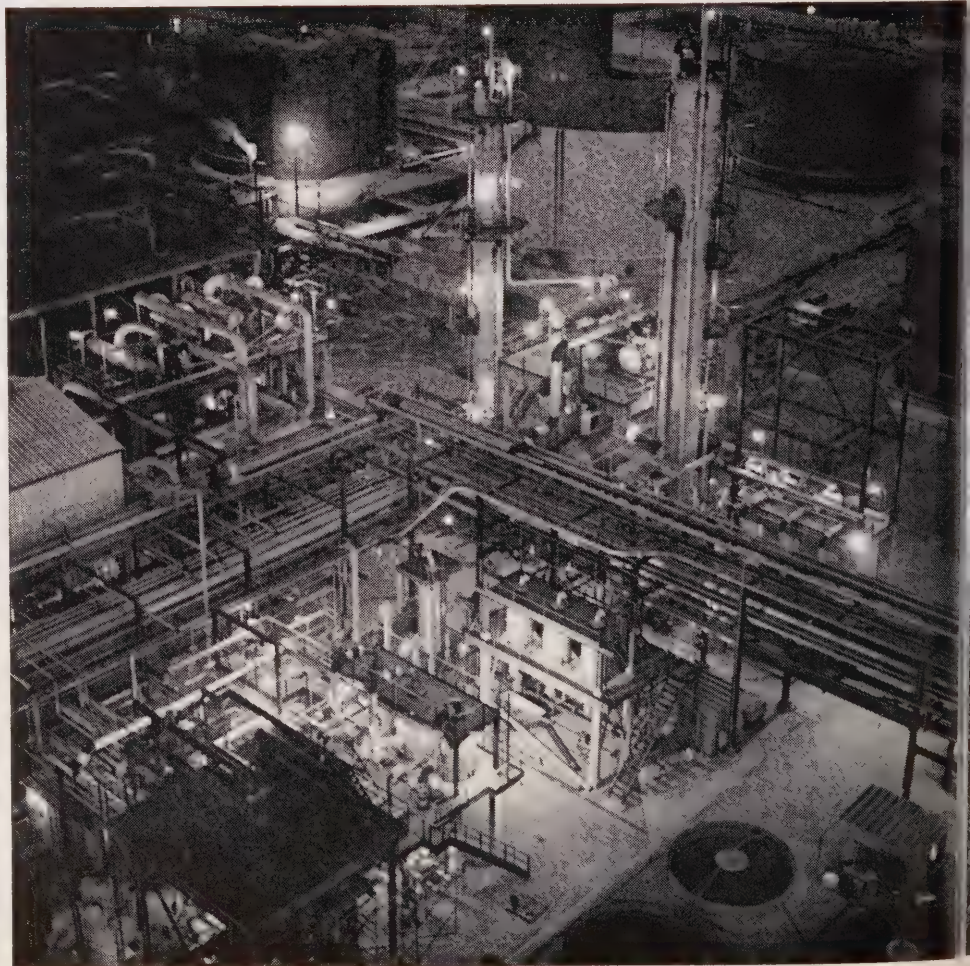
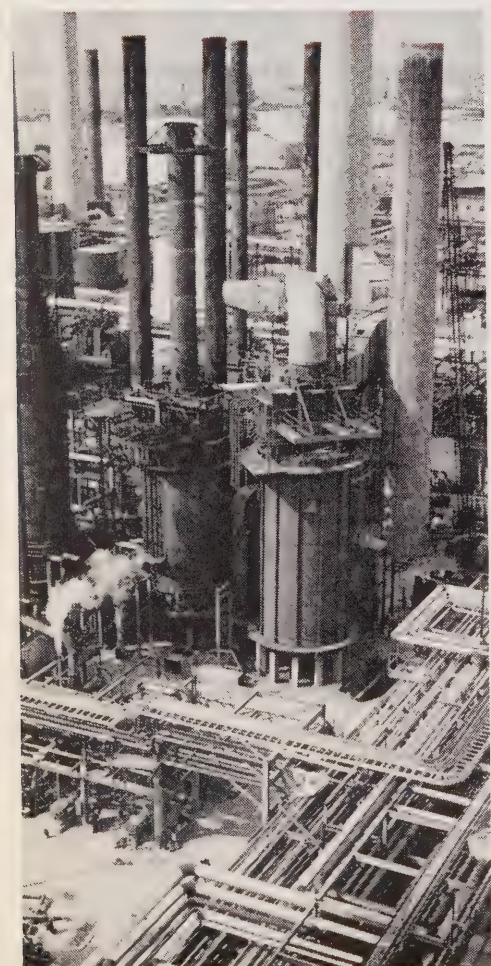
In 1870, the word was railways. Dreams  
flowed with the rails that arched  
across the three-year-old confederation  
that was Canada. Vast expanses of  
unexplored woods and roughly hewn  
clearings made up much of Western

Ontario. Power was a man's muscle, and  
light was oil lamps and the quivering flame  
of a candle.

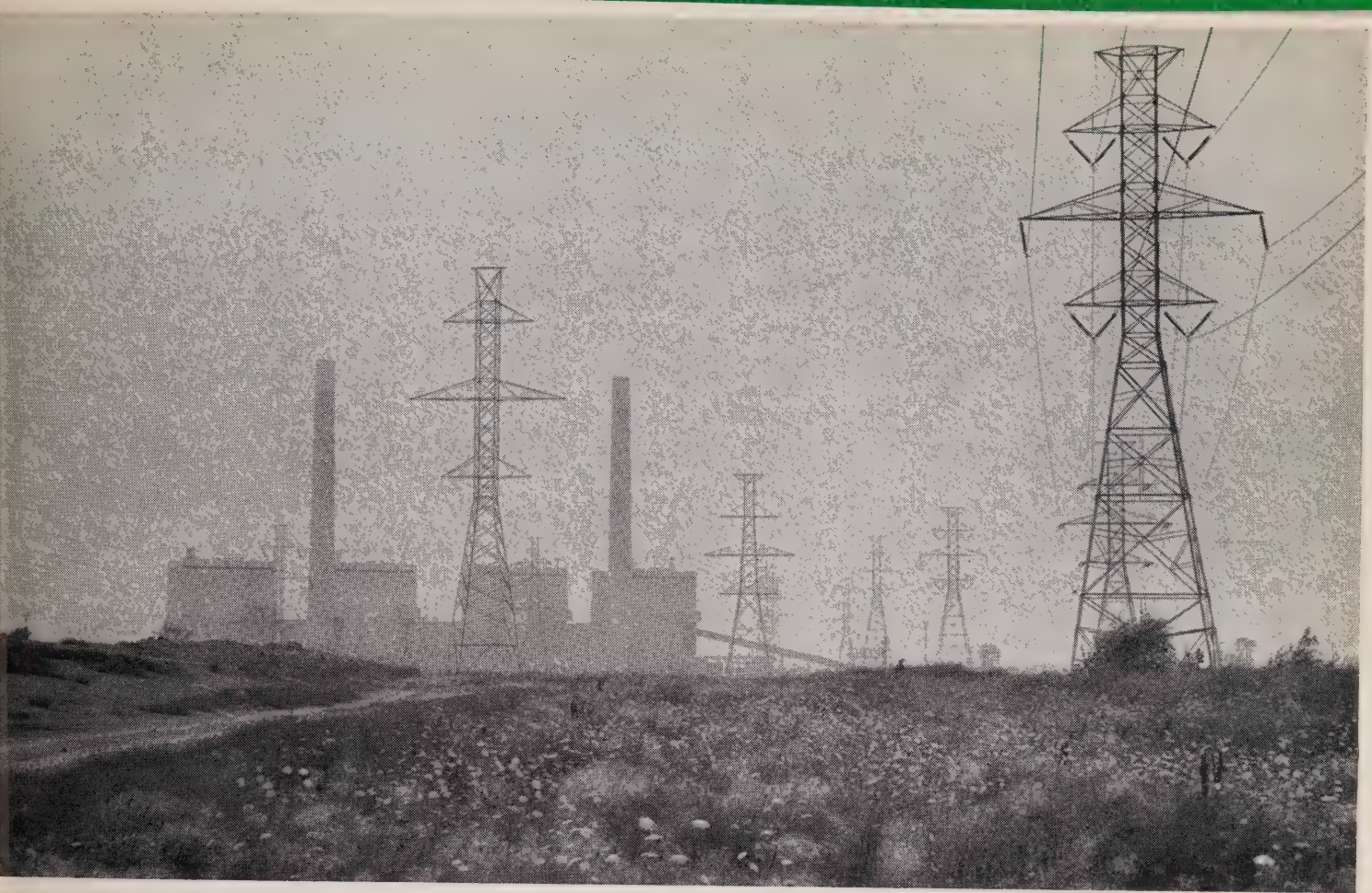
Already railways were stretching to  
the north and to the south across Lambton  
and Essex counties, but it was straight  
through the middle that the officials of  
Canada Southern Railway sought their  
development. For 78 miles from St.  
Thomas to the river bank, the right-of-way  
was deeded and the line opened in 1873.

Through Southwold and Muncey, homes  
of the Indians, and into Alvinston,  
Inwood, and Oil City the line went. The  
community of Brigden, named after the  
engineer that surveyed the route, and









Through the morning mists, Lambton generating station transmits power along lines that follow a former railroad to St. Thomas. Left: railway station at Courtright as it appeared in 1906 and Imperial Oil's modern refinery that operates night and day at nearby Sarnia.

Courtright itself, namesake of Milton Courtright, president of the Canada Southern, were created.

Oil was flowing from the wells of Sarnia, Oil City and Oil Springs and the railway immediately filled the transportation gap. Spurlines were stretched to Sarnia and Oil Springs.

Local traffic was not the original plan. Lines were to connect up with railroads on the American side, and from there it was to be a shortcut to Chicago via the Michigan Air Line. But the plan changed with the lease of the Michigan Central Line to the Michigan Central Railway. The Canada Southern was intended to serve a community it only happened to pass through.

In 1894 the Michigan Central took over the line. In 1929 the line was leased to the powerful New York Central Railway. A few years later, passenger traffic ended. And on April 30, 1960, the line was finally closed. Tracks and equipment were removed.

Steam power beyond the wildest dreams of Milton Courtright will soon channel energy instead of people and freight back along that very path to load centres in the London area. Lambton's output will be fed into the provincial grid system, some of the hungriest customers of which are industries located in Sarnia's Chemical Valley.

Dow Chemical of Canada, a direct customer of Ontario Hydro, is the number one consumer in the area. Its peak demand exceeds 120,000 kilowatts. Much of this power is used in the electrolysis of brine for the production of chlorine and caustic soda.

A Dow spokesman said the presence of Lambton power station was "comforting" because it means less chance of an interruption in the chemical concern's sprawling processes.

Other direct Ontario Hydro customers include the Imperial Oil refinery, the Shell Oil refinery at Corunna and the new Canadian Industries Ltd. fertilizer plant south of the power station.

Polymer Corporation still generates much of its own power, but buys some power from Sarnia Hydro, which also supplies the Sun Oil refinery and a major pumping station of Imperial Oil Ltd. Other customers

of the Sarnia utility include Fiberglas (Canada) Ltd. and a leading manufacturer of carbon black, Cabot Carbon of Canada Ltd.

"Having Lambton near us stabilizes voltage control in this end of the province and this is very important," says C. S. Phelps, manager of Sarnia Hydro.

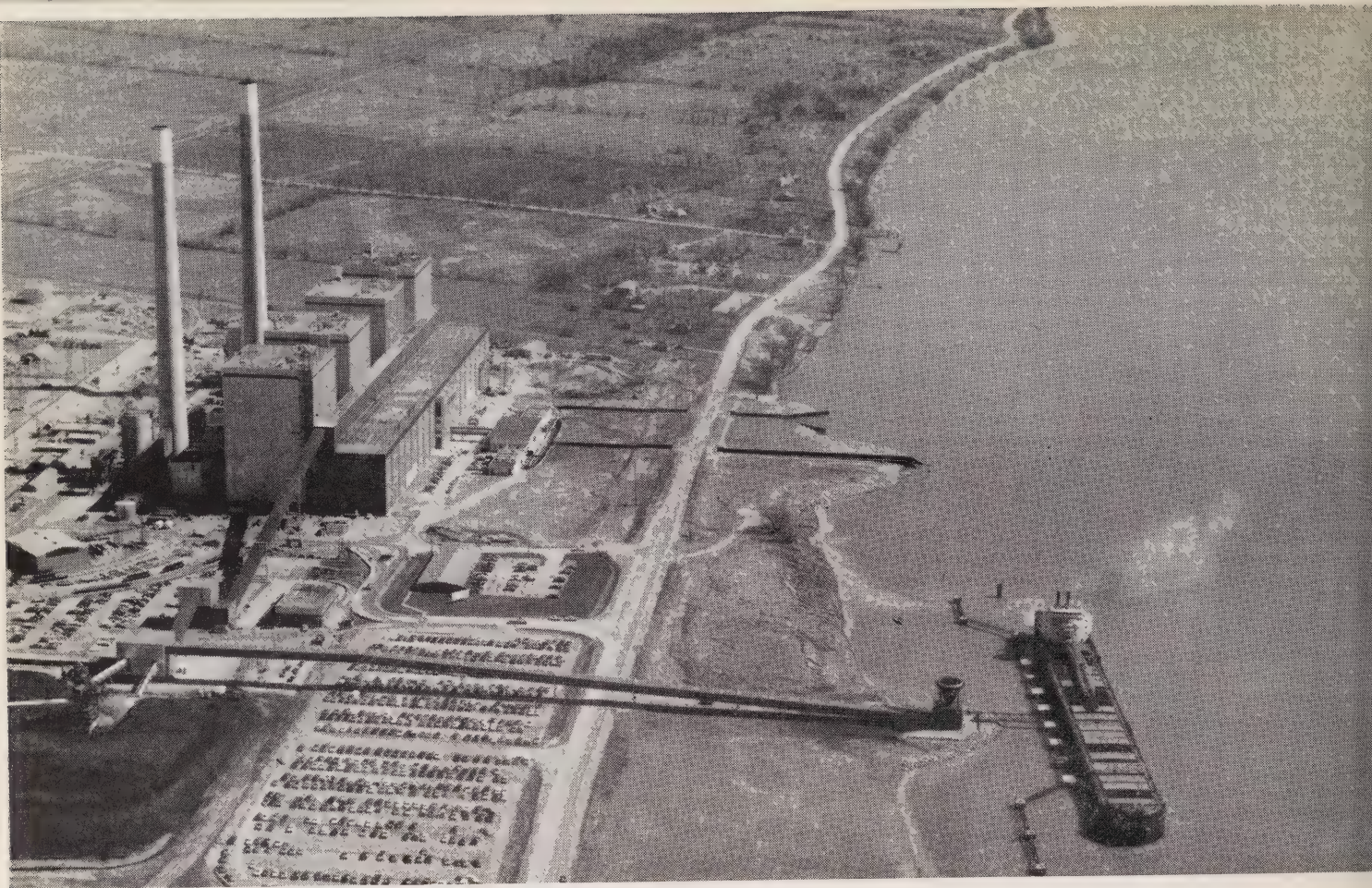
Rumors about the building of the huge power plant first began to fly in 1963. Moore Township, in which Courtright is situated about 14 miles south of Sarnia, was on the verge of fantastic industrial development as the riches of the Sarnia petro-chemical industry began to spill southward.

The blue St. Clair offered two necessary ingredients as a site for thermal generating operation: plentiful water and access to coal-carrying ships. The announcement finally came in March, 1964.

Originally, Lambton was to be a 1,000,000-kilowatt plant but the blurring development of the province made it necessary to announce seven months later a doubling of capacity.

Cecil Armstrong, then and still reeve of Courtright, called the announcement "a businessman's dream". Today he still





calls the development "the biggest thing ever to happen to the area."

On the drawing boards are plans for a 140-home subdivision in the village.

"We definitely would not have had this development without Hydro," he said. "I really hope we can get our rezoning and get started. We'll have no problem filling the lots."

His community is aiming to provide housing for the 200 employees who will operate the station on its completion.

The construction project itself is, of course, pouring thousands of dollars into the economy of the region. No special housing was provided by Hydro since it was correctly estimated the area could absorb the hundreds of workers and their families. More than 2,100 workers from all over Canada were at one time employed on the 450-acre site.

Moore Township clerk D. C. MacDonald anticipates a substantial increase in the grant in lieu of taxes from Ontario Hydro to his municipality. In 1968 the grant was \$26,000.

"The plant cannot help but attract even more industry than we now have," he said. "We aren't a frontier boom town, but the impact is certainly being felt."

The smiles of local officials match the pride of Hydro as the gargantuan proportions of the station take final shape.

Past the front door weaves Highway 40, destined to become the St. Clair River Parkway and a main scenic route along the river. Driving south from Courtright, the traveller finds a man-made hill to the left. It will hide the stockpile of coal that at times will loom high with 2,500,000 tons of fuel.

Soaring over the roadway is a conveyor housing that will pick coal from the dock to the right and whirl it at 6,000 tons an hour to the storage area.

Beyond the hill and to the left, a computer-operated stacker-reclaimer machine towers 84 feet in the air. It grinds back and forth on an 800-foot track to spew coal from the ships into the pile. Then it will scoop up coal in its nine buckets and empty them on to conveyors leading to the nearby powerhouse. At full load, the plant will consume 700 tons of coal an hour.

Under the roadway runs a water intake that will draw about 500,000 gallons of water a minute into the station for cooling purposes. The water swirls back into the river just to the south of

the station — a few degrees warmer, but otherwise unchanged.

Two 550-foot chimneys will dispel gas high into the sky. Electrostatic precipitators will remove 99.5 per cent of the fly ash. This is trucked to the back of the site and piled in a 132-acre lagoon that will take at least 20 years to fill.

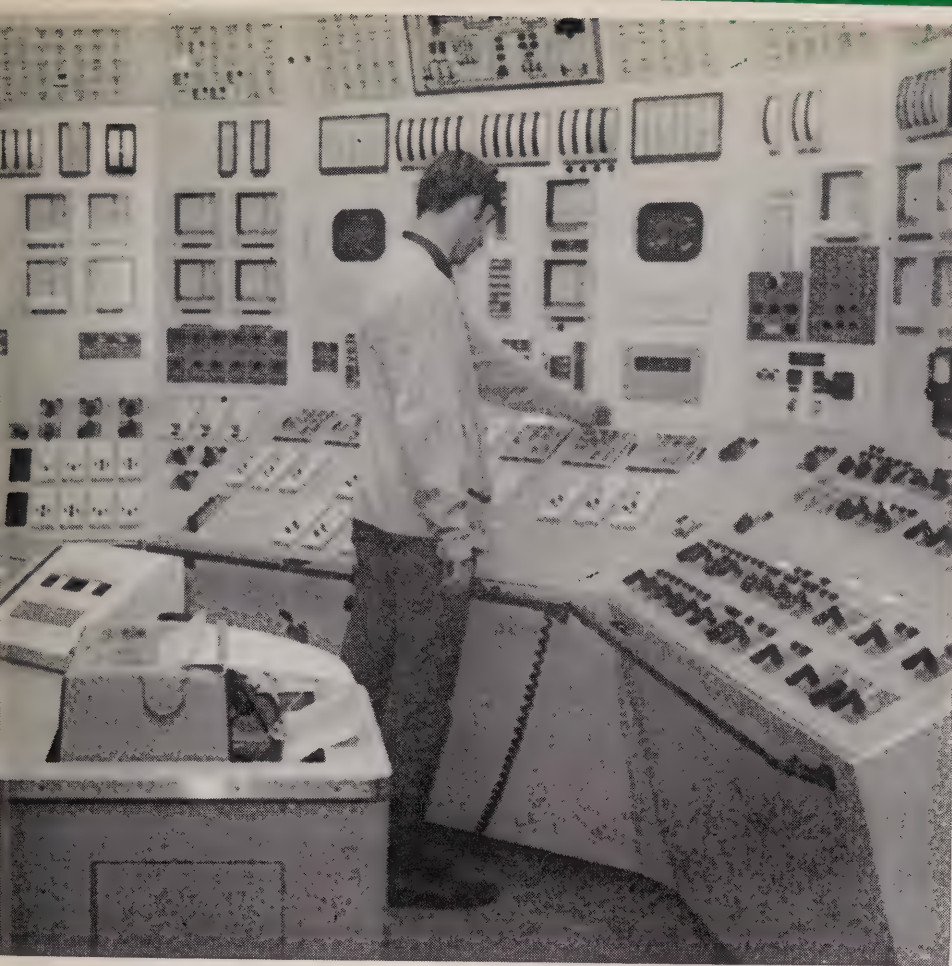
Inside the plant itself, four boilers will eventually generate 3,600,000 pounds of steam an hour. Each will produce 2,350 pounds per square inch at the turbine, with superheat and reheat temperatures of 1,000 degrees.

Power produced by the station, the fifth coal-burning plant built by Hydro since 1949, would supply three large industrial centres like Hamilton.

Mindful of the dangers of air pollution Hydro is taking special care its station will not be a contributor. Besides the precipitators and the extra-high chimneys to disperse sulphur dioxide (a by-product of coal combustion), a special reserve of lower sulphur coal will be stockpiled for use when the weather man warns of temperature inversion.

Extensive reviews will be under way constantly in cooperation with existing pollution detection groups in the area.





*Coal boat docks on the St. Clair River to unload at the Lambton site. Operation of the huge stacker-reclaimer machine is performed from the station's control room.*



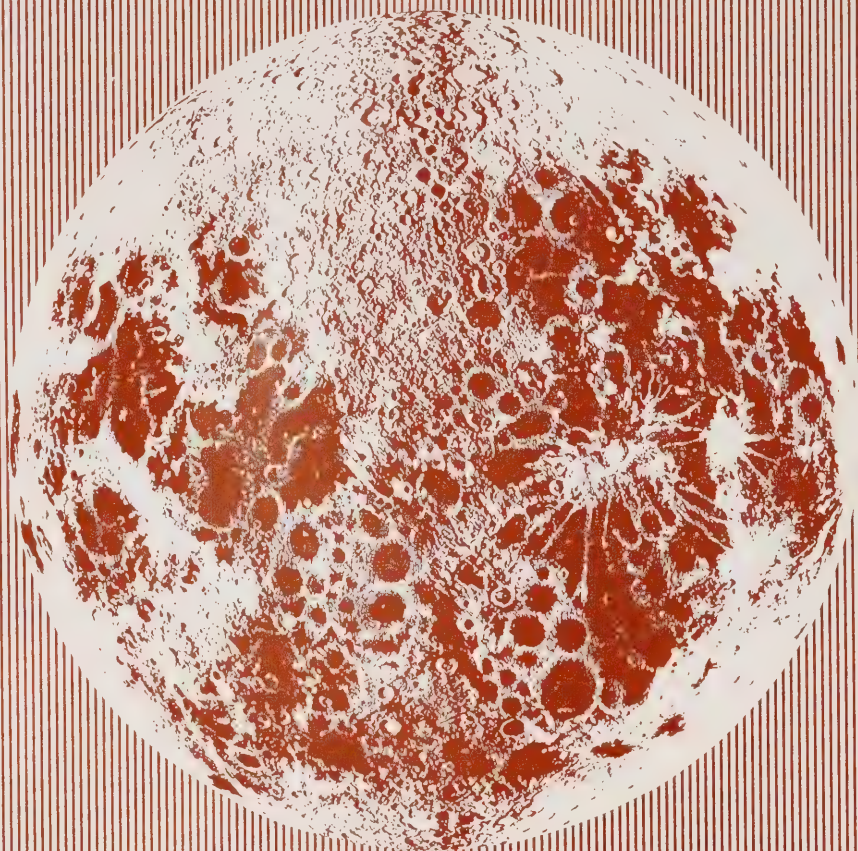
Just past the station, again on the left, stands a huge steel tower with lines glistening across the river to the American side. Visible across the river is the Detroit Edison generating plant. Here is realized the dream of international commerce that the railwaymen had a century ago. For this is one of the many links in the international power grid of which Ontario Hydro is a part.

Milton Courtright built his railway across the bushland of Southwestern Ontario. His steam locomotives — two of them were built in St. Thomas — were familiar sights as they carried salesmen and travellers along with the material needed to develop the midsection of Lambton County. He stimulated the growth of towns and villages and his dream ended with a weed-filled right-of-way stripped of its tracks.

Ontario Hydro, it may be said, completed his plans. □



# MOON POWER



History was made this summer when astronauts Neil Armstrong and Edwin Aldrin set foot on the moon. But long before man ever dreamed of a lunar landing, he was extracting power from the moon's gravitational pull.

Centuries ago, European farmers learned to dam tidal creeks to create a storage pond for their mills. Gates set in the dam wall would allow rising waters to flow into the storage basin and be held there. At low tide, the water was released to drive a water wheel.

The Domesday Book, a survey of England made in 1085 by order of William the Conqueror, mentions a tide mill at the entrance to the south coast port of Dover and denounced it as a danger to vessels entering the harbor. Now, more than nine centuries later, the British

are studying plans for a modern version of the same concept — a vast hydro-electric project designed to harness the 50-foot tides of the Severn Estuary.

The variation between high and low tides at the mouth of the Severn is exceeded only by the 52-foot tides of the Bay of Fundy, where an ebb and flow interest in tapping the tides has resulted in the investigation of four possible sites with a combined potential of 10 million kilowatts.

Present studies are centred on an all-Canadian project against the long-proposed Canada-United States Passamaquoddy scheme on the New Brunswick-Maine border.

Construction was actually started on the "Quoddy" project by the U.S. government in 1935 as part of President

Franklin D. Roosevelt's New Deal, with the work financed by funds allotted for unemployment relief. Upwards of 5,000 construction workers returned to the ranks of the unemployed in 1936 when the money ran out.

Post-mortems showed that the intention was to install a 200,000-kilowatt power plant at a site capable of producing three million kilowatts. Apparently, the artificial limitation was imposed because of lack of demand.

Tidal power largely remained a dead issue from then until 1961 when the Rance River project was undertaken on the Brittany coast near St. Malo, the port from which Jacques Cartier set sail in 1514 on his voyage to the Gaspé. The Rance is a one-basin development using the 45-foot tidal range to drive low-gate reversible water turbines. These, in turn





*Access to the Minas Basin, a potential site for tidal power in Canada. Below: Rance River project in Brittany has already harnessed the power of the tides.*

connected to 24 electrical generators, each with a capacity of 10,000 kilowatts.

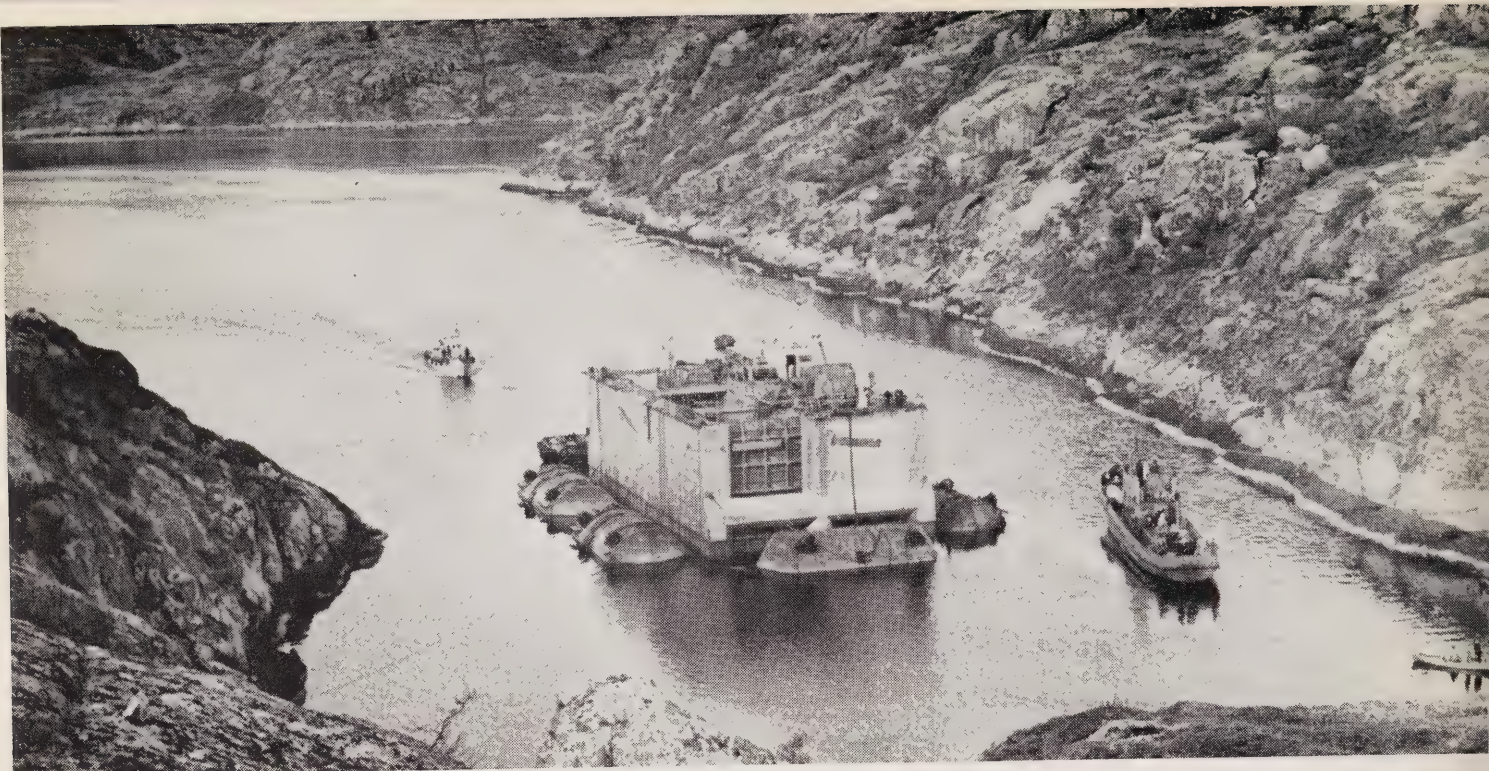
The difference between the sea-to-basin and basin-to-sea output of the Rance project is considerable — a five-to-one ratio in favor of the basin-to-sea flow. Because of this and other limitations of the one-basin concept, such installations are generally not capable of continuous generation.

Subtly benefiting from the French experience, the latest of many proposals for Britain's Severn tidal station calls for construction of two vast basins in the river estuary, one of which would be filled at high tide and the other held at a low level by draining at low tide. Between the two basins there would be a dam containing 175 or more turbo-electric generators with an estimated output of some 50 billion kilowatt-hours a year.

A double-basin system can derive roughly twice the power from a given volume of water as compared with a single-basin scheme. Alternatively, for the same power output it requires only half the reservoir capacity. The Severn system could be assisted by pumping to overcome the lost output during neap tides, when the gravitational pull of the moon is counteracted by that of the sun. Generation would be continuous over 24 hours.







Novosti Press Agency

*Russians floated the entire shell of their powerhouse down to tidal power site on the Barents Sea, 50 miles from Murmansk.*

Experts favoring the Severn project say that the power produced would be much cheaper than nuclear power. But low-cost electricity is not the only advantage. The first phase of the Severn proposal also includes a flood control plan for the lower reaches of the river and later stages provide for the reclamation of about 250 square miles of land for a major airport, motorways and docks capable of handling the largest ships.

Actually, a large hydro-electric project like the Severn scheme would be a useful addition to Britain's power resources. The country has a heavy investment in expensive-to-build nuclear plants which need to be operated as near to capacity as possible at all times to take advantage of lower running costs.

Engineers see how tidal power could be used to reinforce generation by nuclear and coal stations at periods of high demand. At times of low demand, surplus nuclear power would be used to pump water to an upper reservoir at the tidal station, from which it could be released to the powerhouse during peak hours.

In another bid to harness the tides, the Russians have built an experimental power station on the Barents Sea, 50 miles northwest of Murmansk. Built across the neck of a bay called Kislaya Guba, and with its reversible turbines powered by 21-foot tides surging in from

the Arctic, the world's second tidal station produced 400 kilowatts of first power last December. A second unit in the single-basin development will raise the plant's capacity to 800 kilowatts.

Construction of the Russian station, which took several years, is a story in itself. Rather than contend with supply problems, severe weather and other adverse conditions at the site, the builders installed only the basic foundations on the spot. The 5,000-ton shell of the powerhouse was cast in reinforced concrete near Murmansk and floated into position on vast pontoons towed by barges.

The station is designed to serve as a pilot for more ambitious developments, including a possible full-scale tidal plant near the entrance to the White Sea.

Whether large tidal stations will ever be built is an open question. The site most favored in the Bay of Fundy appears to be the Minas Basin of Nova Scotia, a project that would initially call for construction of a dam to span the four-mile wide entrance to the basin.

Tides in the Minas vary from 21 to 52 feet. Harnessing of the site's five million-kilowatt potential would require a curving powerhouse longer than the strait is wide. Any tidal dam across the Minas Passage would have to span water at least 200 feet deep.

Yet Minas is described in some government reports as the most probable damsite in an area where it and the three other sites under study have a yearly potential of 45 billion kilowatt-hours. That adds up to nearly a quarter of the total consumption of electricity for all Canada in 1968.

In addition to being the site with the highest power potential, Minas Passage has another big factor in its favor. Any dam built across the strait and designed to double as a causeway capable of handling highway traffic would join the east and west regions of Nova Scotia.

Feasibility studies in the Bay of Fundy are under the direction of the Atlantic Tidal Programming Board, a body established in 1966 by the Federal Department of Energy, Mines and Resources in partnership with the governments of Nova Scotia and New Brunswick.

From all indications, markets for power from the Bay of Fundy already exist and are growing, particularly in the New England area where a survey was recently authorized to ascertain the electrical needs of the six-state region up to 1990. Interconnections between Canadian and US power grids are among the possibilities to be considered.

Of course, regardless of the outcome of the Bay of Fundy studies, the tides will continue to ebb and flow. Unless the moon changes its course, that is. □



# For a cool, cool smoke... make it king-size and filter

by Hal O'Neil

ch by inch, foot by foot, a tall chimney stack on the Lake Erie shoreline was recently raised over a period of six weeks to the dizzying level where it occasionally gets lost in the clouds.

The 655-foot king-size stack at Nanticoke generating station tells a double first for Ontario Hydro. Its height alone makes it unique . . . Hydro's tallest structure. And the chimney will serve four units of the 2,000,000-kilowatt coal-fired plant. Up to now, the maximum has been two units per stack.

As far as getting the job done, project engineer Doug Sumner sees it as just another stack. Mr. Sumner works for the Canadian Kellogg Company, contractor for the \$2,000,000 job. At 26, he's built more chimneys than he can remember, both in Canada and the United States. Only recently he was in Morgantown, Maryland, putting up a 700-foot giant.

But Mr. Sumner does admit that each of the chimneys he's been involved with has had its own characteristics. In the case of Nanticoke, it's the design. The stack will contain four flues, one for each unit, much like a four-barreled shotgun. It's also the highest of its type in North America. Ontario Hydro did the original design work, although Canadian Kellogg assumed responsibility when it was awarded the contract.

Pioneered in Britain, the multi-flue concept adds extra punch to the gases emitted from the chimney. When they leave the 18-foot diameter flues at Nanticoke, they'll be travelling at 90 feet a second. This, combined with the 655-foot height, will force the exhaust stream into the upper atmosphere for dispersal, penetrating such adverse conditions as temperature inversion.

In 1971, when the station begins producing power, electrostatic precipitators will remove 99.5 per cent of the fly ash particles from the gases before they even enter the stack.

When something as precise as this is being erected, every operation from the ground up is critical.

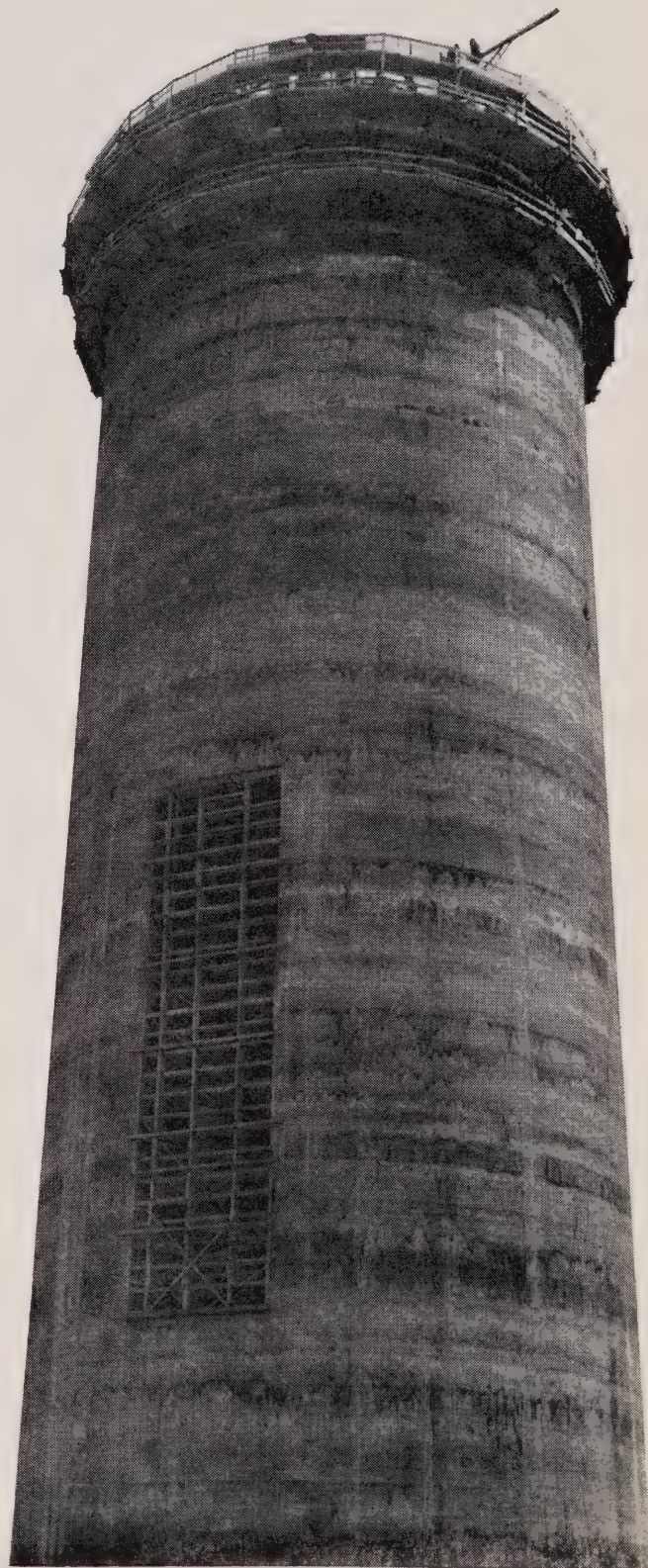
Take the placing of the chimney base last March. Hydro engineer Holt, who was in charge of the job, says: "Despite the outside temperature hovering around the freezing point, we had to maintain a temperature of 55 degrees to preserve optimum pouring conditions." Steam lines were run an eighth of a mile from the boiler house and fan-type circulating heaters were installed to keep the base housings warm.

Measuring 80 feet across and 16 feet deep, the foundations took 30 hours of continuous work and about 2,700 cubic yards of concrete. With 200 tons of reinforcing steel rods at 12-inch intervals, the entire structure weighed in at 10,000,000 pounds. Compressed air vibrators were used to consolidate the mass of concrete and eliminate the voids.

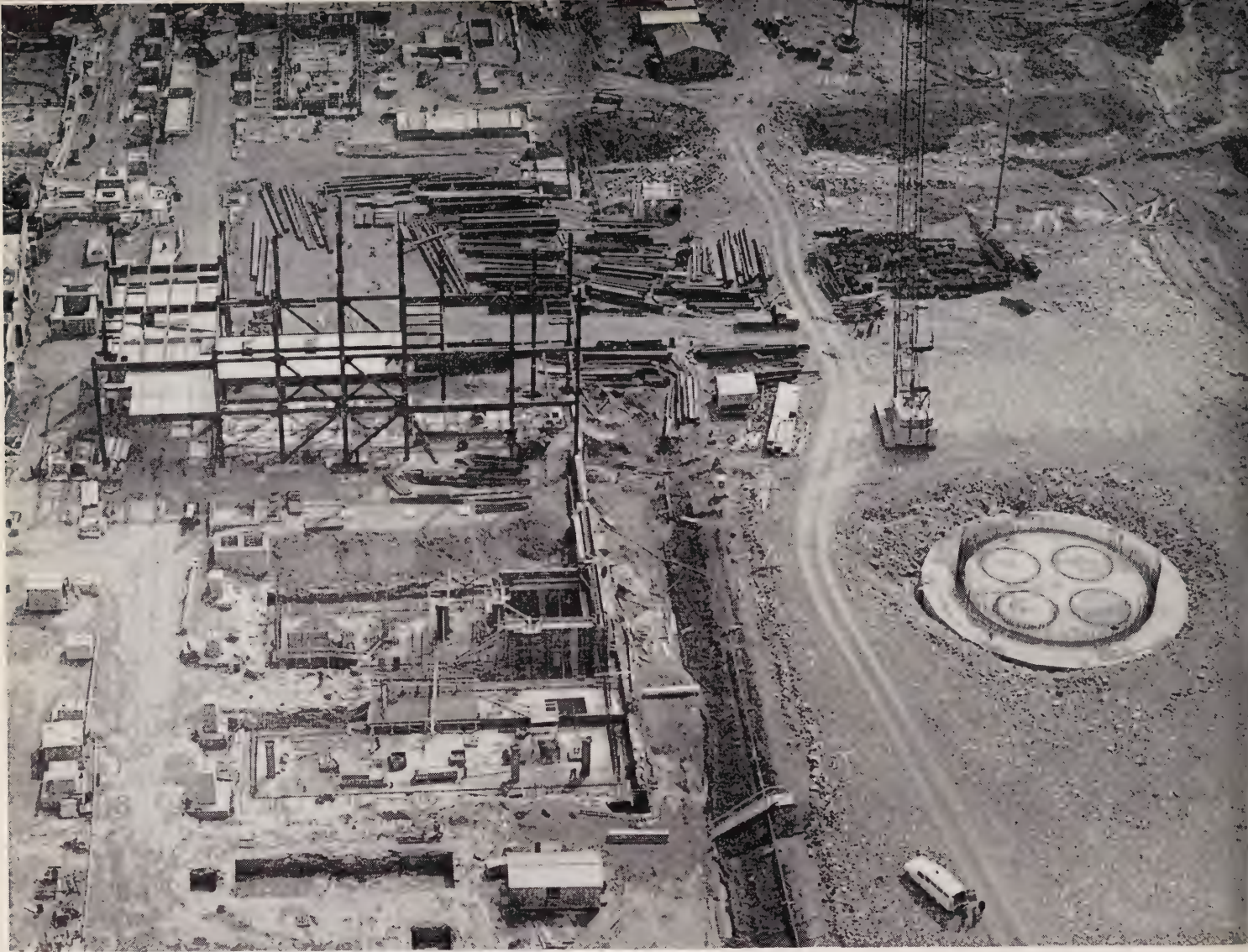
It took a week for the massive slab to cure; a month for it to reach its maximum strength of 4,000 pounds per square inch.

Using a slip-forming technique — the continuous placing of concrete in a rising structure — the stack's outer shell was raised inch by inch. Split into three crews, 85 men worked around the clock from Monday to Friday. Supervisors put in two 12-hour shifts.

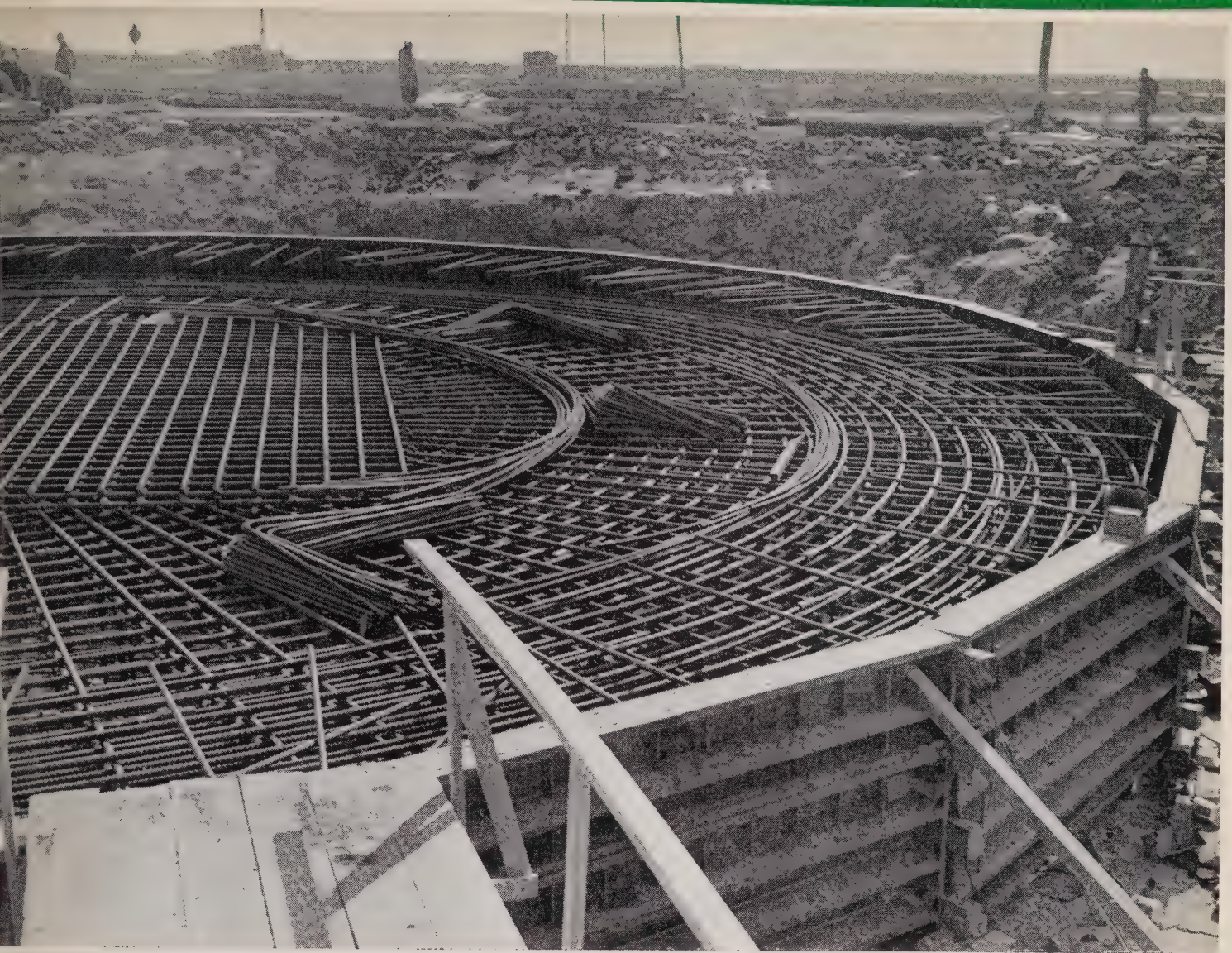
A few of the men had worked on a stack before. "We just hired











*akes massive foundations of reinforced steel support a 650-foot chimney stack. But project engineer Doug Sumner will move on to tackle the nearly twice that height at Sudbury.*

...m through the union halls in Hamilton," says Mr. Sumner. "With a bit of training and explanation in the early stages of the job, everything went well."

Five working decks — two inside and three outside — enabled men to position concrete buckets for the pour, place steel reinforcing rods and smooth off the fresh cement with trowels. And all the while the forms edged steadily skyward.

They were carried up on jack rods running through the 27-inch thick chimney wall. Two sets of jaws clamped on the rods held the forms and decks in place. As one set of jaws gripped tight, the other moved up an inch. Then the other was released and the whole assembly ascended.

One problem was that the movement tended to twist the forms out of alignment and could have resulted in a Leaning Tower of Naticoke. But an optical plumb was used to keep the stack on straight and narrow.

In the early stages — about the first 130 feet — a mobile crane with a one-yard bucket was used to lift the concrete from the ready stream of trucks up to the forms. Beyond this height, the concrete was hauled up by cable in a half-yard bucket operating from the inside of the shell. A yellow cage-type elevator raised men and other materials to the working level.

Reinforcing rods of steel are spider-webbed horizontally and vertically throughout the shell. For the first third of the stack they are 1½ inches in diameter; above that just half the size.

Oddly enough, the chimney tapers little as it rises. The outside base diameter of 60 ft. 4 ins. diminishes only slightly to 57 ft. 10 ins. at the top. The walls themselves also taper — from 27 inches in thickness at the bottom to 12 inches at the top.

In a conventional chimney, the base has to be large enough to withstand the slight swaying movement caused by wind. Further up, it's possible to taper the stack and economize on the quantity of concrete. The lack of taper at Naticoke is dictated by the four steel flues. Clearance around these flues must be constant the full height of the stack. Thus the only tapering practical is in the wall of the outer shell.

Work is now progressing on the installation of the four flues and insulation inside the big stack to meet the first unit's 1971 in-service date. But Doug Sumner is already thinking about his next job. It's a 1,250-foot stack for International Nickel at Sudbury. □



# Dr. Downer's

Nearly 50 years ago, two Toronto men puzzled over a cumbersome electric water heater lying disassembled in their basement. Although one of the latest gadgets on the market, the heater was attached to the outside of the water tank and was notoriously inefficient.

"We figured that if we could devise an element small enough to fit inside the tank, all the heat would be put to work," recalls dentist-inventor John Downer, then only a student.

Dr. Downer and his brother-in-law put their heads together and came up with a 500-watt heater that gave them a constant supply of hot water. They even insulated the tank with newspapers and old diapers.

"It worked so well we patented the idea and took it to Toronto Hydro," says Dr. Downer, who now lives in a roomy old home in Lawrence Park. "I guess we impressed the manager because he called in his assistant, and then they called in the engineers. But the technical men didn't think it would work. Anyway, we ended up installing our heater in the assistant manager's home. It took only three or four days to convince him."

The heaters were displayed in the Toronto Hydro showrooms and Dr. Downer and his brother-in-law installed them around the city until 1930 when the now familiar hairpin-shaped element was introduced.

"It wasn't just a case of selling immersion heaters," says Dr. Downer. "We first had to sell people on the idea of a constant supply of hot water. In those days, most homes either had a gas heater or a boiler at the back of the coal range. If there was no fire, there was no hot water."

The notion of an electric immersion heater is only one of a stream of ideas that has flowed from Dr. Downer's agile mind. He quickly adapted the immersion heater for use as an engine warmer for his Model-T Ford (some of which he sold to Canadian General Electric), and he developed an automatic mixer for the silver compound used for filling teeth — "there are better ones on the market now, but mine was the first successful one."



And he's currently working in his "rat's nest" — a conglomeration of power machinery, wires and radio apparatus in the basement of his home — on a safety device to prevent gasoline explosions aboard power boats.

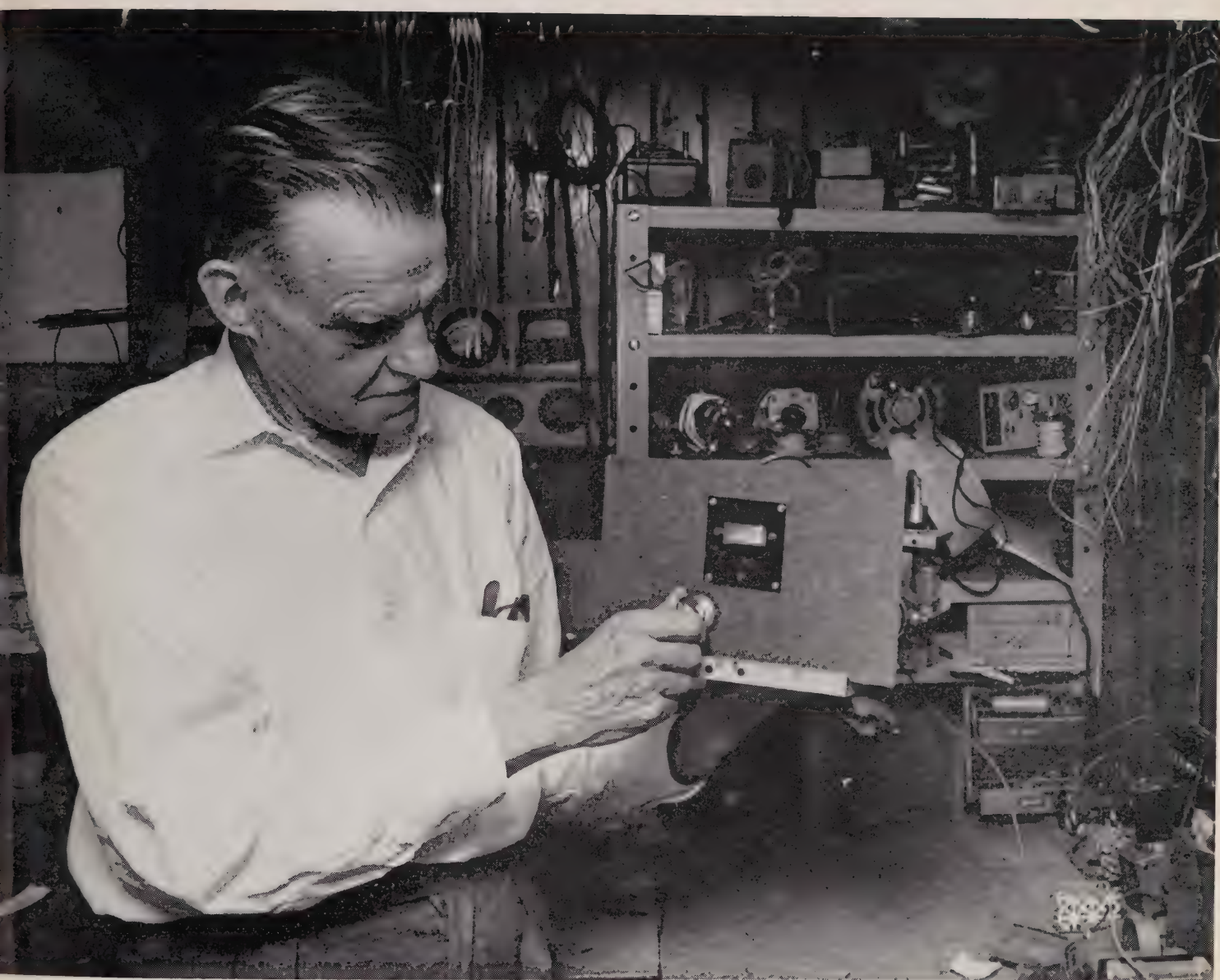
"Basically, the idea relies on the chemical sensing of hydrocarbon vapors. If there's any chance of an explosion, the motor won't start up when the ignition key is turned. It should save a lot of lives. The only trouble is, once I've got an invention to work, I lose interest in it."

Dr. Downer attributes his inventive ability to his practical upbringing. His father was a pattern maker by trade and built five cars about the time McLaughlin and others were entering the automobile business.

"With the knowledge I gained as a kid, I could have made a living as a pattern maker, a machinist or a foundryman. Lots of people have ideas but can't put them into practice. Fortunately, I have both the ideas and a practical background."



# Hot Idea . . .



*As a young man, Dr. John Downer even built a model to sell his idea of continuous hot water. He's now working on a device to prevent gasoline explosions aboard power boats.*

Dr. Downer can trace his family back to the 1600s when his forebears emigrated from Massachusetts from Wiltshire, England. One of his ancestors established a Harvard scholarship and another founded a college in Wisconsin which has since gained university status. Yet another Downer served as a surgeon on the sailing ship *Dolphin*, commanded by John Paul Jones during the American Revolution.

Dr. Downer himself has led a colorful career. He became a radio ham in 1912, building his own equipment, and as a summer student was approached by the

Marconi company to act as radio operator on Great Lakes vessels — there was a severe shortage of skilled operators at that time.

During the First World War, he was hired as a radio operator by the British Admiralty and was, in fact, the first Canadian-born operator to hold a commercial radio licence. He was aboard the vessel *Ocean Prince* when it ran aground and sank in the Channel trying to evade U-boats. He saw service in India, but fell sick there and was discharged. He later joined the army and finished up as a machine gunner in Vladivostok.

In his student days, Dr. Downer was an acquaintance of Frederick Banting, of insulin fame. "We had rooms next to each other on Bloor Street at Avenue Road and Banting used to ask me to drop in now and then for tea. He was a keen painter and I still have one of his works.

"Banting had a fine command of the language which beat even my naval vocabulary," Dr. Downer recalls. "On the night the insulin story broke, the *Globe and Mail* called the house around 3 a.m. and asked to speak to Banting. I woke him up and the air went blue. He never did answer the call." □



# *Lifting the lid on the magic black box*

"It was 1906. June 7 fell on a Thursday that year. The weather in Toronto was typical – humid, overcast with a high of 72 degrees. It even rained a little – which perhaps was a good sign . . ."

These words, spoken by newscaster Jack Dennett, lift the lid on the magic black box – Hydro's part in the Ontario Science Centre in Toronto.

From here on the story – told in sound, light and action – is focussed on the future.

The magic black box (the entire area in which Hydro "happens" is painted black) was conceived more than three years ago. Ray Phelps, of Hydro's field and graphic services section, says: "We were thinking about it before Moriyama had anything on paper." Raymond Moriyama is the architect who designed the multi-level centre.

"We asked ourselves what did we want to do with 5,000 square feet of space in the centre's Hall of Engineering."

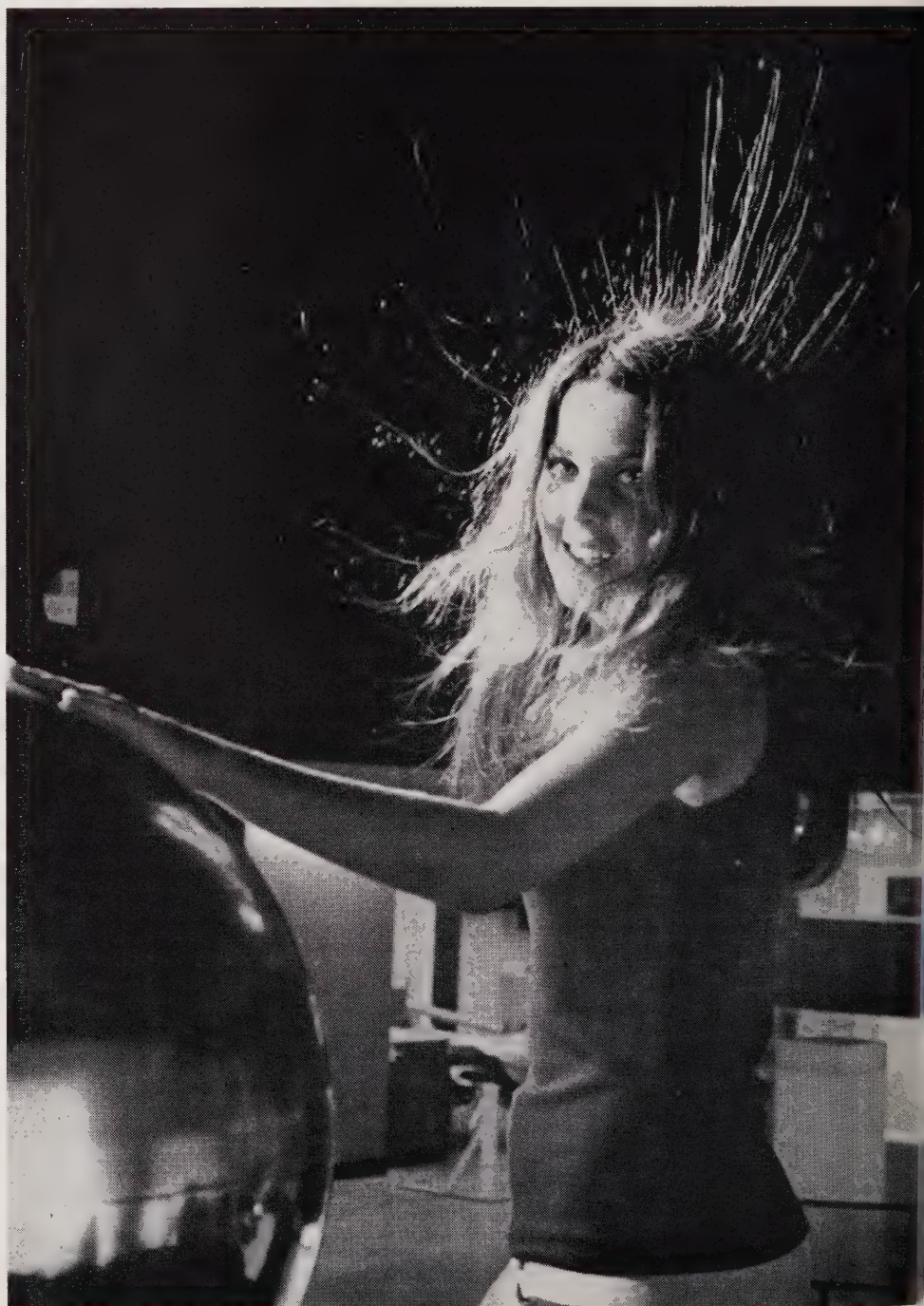
The concept evolved with help from the research, transmission and distribution and system planning divisions. Now the task was to create a display that would fit the concept. There were many "try-on" sessions until things were boiled down to pure education and sprinkled with entertainment through participation.

Display Service Ltd., a firm which specializes in such things, was brought into the picture. Its people also went to work and physical entities began to replace ideas.

According to Bob Falconer, of the centre's staff, visitors will break down about 50-50 into school tours and casual drop-ins. "Already we are booked heavily until next March for tours," he says. Prime Minister John Robarts opened the centre last month as Ontario's official Centennial project.

As visitors enter the Hydro area, their first stop is a huge stylized map of Ontario. A push of a button sets the history of public power into motion. As Jack Dennett's voice traces the growth from that day in 1906, pulsating lines of light

The eagerly awaited Ontario Science Centre has opened its doors at last. And it was well worth waiting for. Hydro's contribution is the story of electricity in the province. It is told in the mystery of a darkened room and punctuated with million-volt bursts of pure power.







*Some of it's hairy, but other sections of the Hydro happening command rapt attention.*



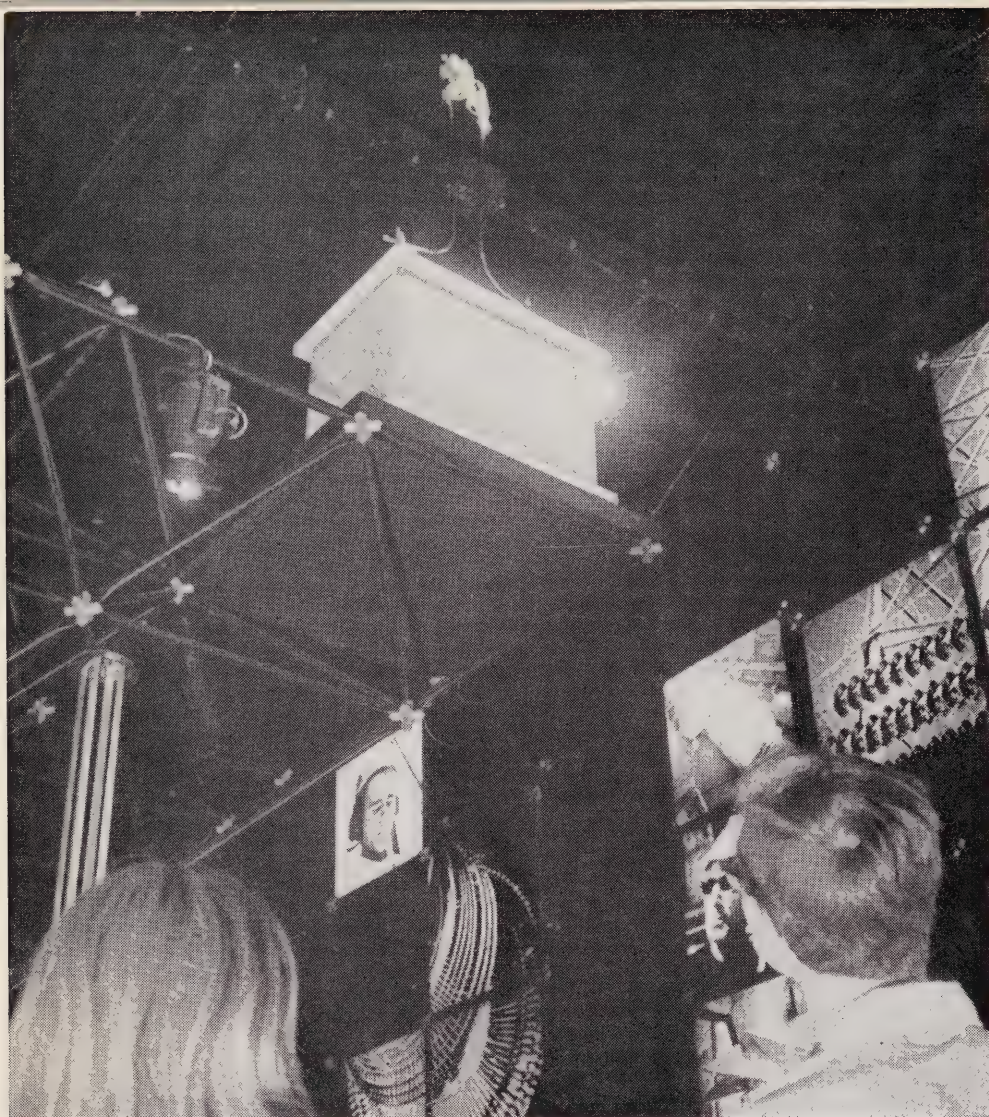
start creeping across the map, showing the increasing flow of energy through the years. As the power flow builds up, a window shows a year and the corresponding total resources in kilowatts.

Accompanying this is a series of color transparencies and written copy illustrating the various time periods of the story. Close by is an island displaying a selected group of artifacts from the early world of electrical apparatus and equipment. Back-lighted historical photos complement the museumpieces.

Theatrics come into play as visitors move into a mini-theatre to observe nature's resources at work. Here, 24 hours pass in the space of a few minutes. The panoramic scale model includes a city, industrial and suburban areas, farms, rolling hills, distant mountains and flowing rivers and lakes. All three power sources — coal, nuclear and hydraulic — are in evidence. With lighting effects, the viewer is taken through a dawn-to-dusk sequence with the gathering of clouds, a summer storm complete with lightning and rainfall and a step into nightfall to illustrate how electric power is used.

The diorama is built of fibreglass, sponge rubber and plastic so that the five-gallon rainfall doesn't affect it. Even a timed chlorine dispenser has been added to keep everything scum-free. The lake, rivers and streams hold 200 gallons





*The kids are watching a turbulent spark climb Jacob's ladder. It rises due to the convection heated air.*

of water and to make them realistic, particularly at the hydro-electric dams, compressed air bubbles create turbulence. Sound effects add authenticity.

Moving out of the diorama, visitors are treated to an animated explanation of the workings of generating stations. Steam condenses, fires roar, neutrons split off and turbines spin at the push of buttons. Here, a human demonstrator — one of the few employed in the centre — can manually control the systems for a step-by-step build-up of power.

Next, visitors see how electricity leaves the generators and is transmitted over the power network. Facts, figures and illustrations show the massiveness of the operation. Transformers are explained and people can operate a device to see how the principle of transformation works.

Through a series of photographs, drawings and text, significant steps in transmission and distribution are traced. These range from the design stage where computers are used to plan transmission lines to the fabrication and assembly

of transmission towers. A 20-foot quarter-scale model of an extra high voltage tower is included.

The power panorama also delves into the concepts of base and peak load. The needs of home, industry and commerce are illustrated together with the vital role that load forecasting plays in meeting both immediate and long-range demands.

The functions of a sub-station are shown with schematic and animated illustrations. Protection functions are seen by visitors, including an actual air blast circuit breaker and a three-dimensional model which shows the arc-quenching action.

"Ladies and gentlemen, in the centre ring we have a circus of science. You'll see a Tesla coil tantalize insulators with the snap-crackle of a million volts; resistance of the human body; the tickle of static electricity; the graceful, but harmful dance of the wind in transmission lines; colors appear and disappear before your eyes and electrons flow through a half-atmosphere."

A second demonstrator takes the stage in this area to teach visitors the basics of electricity. Dotted around the area are a number of audience-participation devices. "These give visitors, especially kids, a chance to play as they learn," says Mr. Phelps.

Included in the do-it-yourself exhibits are lessons in concrete technology, the effects of a changing magnetic field and the carbon filament lamp.

Then, a few steps up a ramp, visitors are time-machined into the future — right from tomorrow to the 21st century. The structure, fashioned like a tent of triodetic tubular forms, blossoms forth with patterns of motion blended with electronic sound effects. Images of you and technological advancement intermingle with flashing lights and colors, and the voice of 22-year-old Greg Mittler throws out a challenge for the future with a ballad written specially for the exhibit.

These are the secrets of the magic black box. □

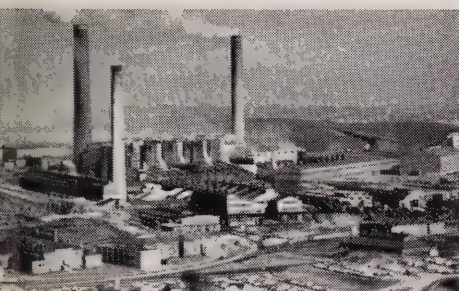


# feeling the pulse

Regional government was the dominant issue this fall as those elected to run the province's municipal electrical systems discussed the pros and cons of newer and larger utilities. Highlights of the Ontario Municipal Electric Association's conferences at Atikokan, Sudbury and Muskoka are presented here.



Receiving 15-year long service awards from OMEA president Henry Baldwin at Sudbury were North Bay Mayor Merle Dickerson and Sudbury Hydro vice-chairman E. C. "Ted" Dash.



## Sudbury - district 9

### Deep commissions, they urge

Five resolutions were presented to delegates for approval and later voting by the province-wide group. Four were successful while one was defeated.

Two of the resolutions approved dealt with regional government and came from Sudbury Hydro and Sault Ste. Marie PUC. The Sudbury proposal asked that the provincial government, through the OMEA, be conditioned to preserve the principle of power at cost and that municipal Hydro continue to be administered by directly elected officials. The Soo resolution was similar, but asked that "the commission concept at the regional or local level" be maintained.

The balance of the resolutions came from North Bay Hydro. Evoking more discussion than any other resolution was the one voted down. It asked that all operators of mobile electrical devices with a lift of more than 17

feet be examined and licensed by the province.

Bruce McCubbin, of North Bay, said the move was requested as a result of two accidents involving cranes. In one incident, a man controlling the lifting of cement blocks hit an overhead wire and was severely injured. "We feel the licensing would protect operators and property and could save a life," said Mr. McCubbin.

Other delegates felt the move would hamper utility operations. Utilities make extensive use of aerial devices. John Darby, of Espanola, commented: "The scheme would be much too difficult to administer."

One of the successful resolutions requested the OMEA to support research into the feasibility of the electric car and called for reports on its effect on the electrical load and on reducing air pollution. The resolution's preamble stated that increasing industrialization and the proliferation of automobiles resulted in noise and atmospheric pollution. The electric car, it said, reduces both.

North Bay's second successful resolution concerned the costs of moving poles and other equipment where a highway is being widened or altered. It stated that present legislation places an unfair proportion of the cost of moving poles on municipal utilities.

The resolution proposed that the relevant act be amended to state that "the cost of work shall be apportioned so that the labor and associated working equipment cost shall be paid by the road authority which

orders the work done — and all costs for materials required for the job shall be paid by the operating corporation."

Present wording of the Act splits the cost between the road authority and the utilities, but does not include replacement or renewal, the cost of supplies or the expense or loss occasioned by the utility. □

## northeast in the seventies

Ontario Hydro Chairman George Gathercole told District 9 OMEA delegates that three of the eight generating stations Hydro has under construction or committed for construction are in Northeastern Ontario.

"The first of these — Aubrey Falls, on the Mississagi River, has just gone into production," he said. "Its two units have a total capacity of 130,200 kilowatts. The other two stations — Wells, also on the Mississagi River, and Lower Notch on the Montreal River — will come on line in the next two years. Wells has a capacity of 203,300 kilowatts and Lower Notch a capacity of 228,000 kilowatts."

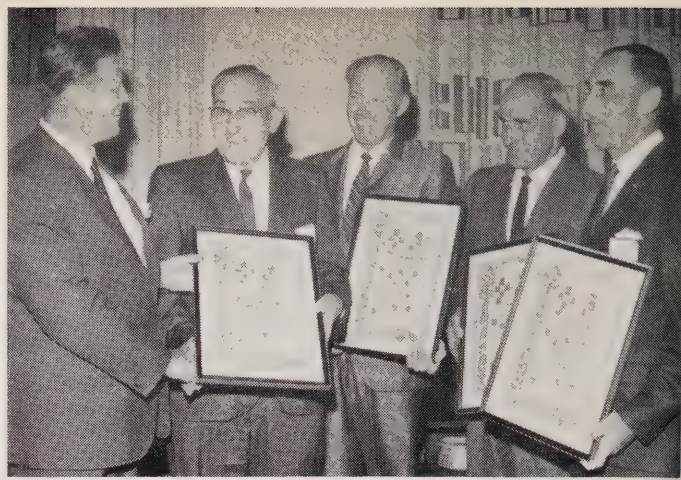
Mr. Gathercole said the three were "peaking" stations which could be rapidly brought into play when a sudden demand was put upon the Ontario grid. He then outlined some of the impending developments in the North that will boost power consumption.

In the Elliot Lake area, the rejuvenated uranium mining industry had brightened





Heading up the Northland MEA are: Standing, J. W. Chapman, president, North Bay; R. S. MacKay, Thessalon; Edward Denommee, Hearst; Roland Marleau, second vice-president, Sturgeon Falls; R. F. Eddy, Sault Ste. Marie; G. J. Kydd, third vice-president, Cochrane; B. A. MacPhail, Capreol and E. C. Dash, past president, Sudbury. Seated is R. M. Duncan, secretary-treasurer, Coniston.



At Elgin House, George Gathercole, Ontario Hydro chairman, presented long service awards to Hugh MacKenzie, Port Elgin; George Tranter, Ripley; Gordon Tudhope, Parry Sound, and Bill Boyes, Alliston.

the economy. Both mining and supply companies planned expansions in the multi-million dollar league which would carry through into the 1970s. Mines would be re-opened, new ones established and mills erected.

Despite labor problems, expansion was also the story in the Sudbury district, said Mr. Gathercole. Increased world demand for nickel had prompted producers to spend millions of dollars in new plants. Overall power requirements were expected to double by 1973, he said.

Discovery of zinc near Timmins had created a great deal of activity in that area. A zinc smelter and sulphuric acid plant were to be built at Hoyle, 18 miles from Timmins, with production scheduled for late 1971 or early 1972. There was also a possibility of a sulphur processing plant that would act as a further stimulant.

After mentioning other areas like North Bay and Sault Ste. Marie where expansion is taking place, the Hydro chairman gave the 100-plus delegates a look at the general economic picture.

In an effort to thwart inflation, the Canadian and United States governments had introduced some of the most stringent monetary and fiscal policies since World War II, said Mr. Gathercole. He added that any projection must allow for the fact that the economies of the two countries were closely interwoven.

Inflation, he said, was widespread. Increases in wages and salaries were driving up Hydro's operating costs. New technology, both in conventional thermal-

electric and nuclear generating stations, was also a contributing factor.

"An unprecedented rise in interest rates has more than doubled our costs for this purpose in the last dozen years," he said. A recent offering of Hydro bonds carried an interest rate of 8.5 per cent — a level unthought of two or three years ago.

With all these factors exerting an upward push, moderate increases in the energy rates paid by municipal electrical utilities to Ontario Hydro could be expected in the immediate future. Despite this, electricity continued to be one of the best bargains available, said Mr. Gathercole. □



## elgin house - district

### a positive approach

When delegates to the Georgian Bay Municipal Electric Association's annual meeting sat down to the table at the Elgin House, the main course was regional government. Side dishes included manpower training and the formulation of a district constitution.

The main course was highlighted by a panel which looked into regional government and the local Hydro systems. It was moderated by Mayor R. S. Bentley, Barrie. Panel members were A. J. Bennett, chairman, St. Catharines PUC; R. J. Boyd, 1st vice-chairman of Ontario Hydro; Muskoka MPP; Brian Donaldson, Department of Municipal Affairs, and J. P. McBeth, a commissioner with Etobicoke Hydro.

Mayor Bentley said the discussion was the first "positive and non-argumentative" approach to regional government.

Noting that regional government for the Muskoka district had been actively pursued for six years, Mr. Boyer observed





The new executive of the Georgian Bay MEA includes: N. H. Robertson, Owen Sound; G. C. Tudhope, Parry Sound; Orser, Orillia; W. G. Boyes, Alliston, and W. R. Tomlinson, Port Elgin. Standing are, D. A. Watt, past president, Orangeville, and W. E. Theaker, 2nd vice-president, Paisley. M. Stevenson, president, Chesley, was unable to attend the conference.



Regional government was the topic of discussion for this Elgin House panel composed of R. J. Boyer, vice-chairman of Ontario Hydro and Muskoka MPP; Brian Donaldson, Department of Municipal Affairs; A. J. Bennett, St. Catharines; Mayor R. S. Bentley, Barrie, and J. P. MacBeth, Etobicoke.

you cannot set up one master plan and then apply it to every section of the province. Local people have to have a large voice in the form regional government will take."

A final report has made recommendations about the new municipal alignment and decisions on the form regional government will take will follow further discussion between the government and local representatives.

While saying it was established government policy to reduce the number of boards and commissions in the new regions, Mr. Donaldson added that electrical utilities were a special case. At present, the government had a full load of regional studies underway, but he recommended that municipalities feeling in need of change might consider amalgamations or consolidation as a solution to their problems.

Mr. MacBeth, chairman of the OMEA legislation committee, said that the Municipal Affairs minister seemed to have established a policy of treating utilities in each region as special cases. It was the OMEA view that electrical service should continue to be provided by a separate commission elected by the people.

Mr. Bennett, whose home area will undergo regionalization in January, said that electrical utilities there would remain for a while as they are. Mr. Bennett is a member of a study group now looking at how local utilities should be organized under the new set-up. Under regional government, the municipalities in Lincoln and Welland counties will become 12.

He cautioned delegates not to discuss the pros and cons if they get into a similar situation. "Get down to the job of seeing how Hydro can function under the new system."

Mr. Bennett said the group was doing a comparative study of one regional utility as opposed to 12 separate ones. "Personally," he said, "I favor the former. I can see savings in management, engineering, payroll, data processing and a central meter shop for a start."

However, it was more likely that recommendations of the committee would indicate 11 elected commissions and one private company that now serves the Fort Erie area.

During the second day of the two-day meeting, three members of the AMEU's manpower training and planning committee — Hugh MacKinnon, Bruce Prentice and Howard Powell — outlined the function and activities of the committee. □

## clearing the confusion

"We are going to need all the confidence based on knowledge, experience and unity that we can muster," said OMEA president Henry Baldwin, of Oshawa, referring to regional government.

He added: "My remarks may contribute more to confusion than clarity, but they are made in an attempt to show just how befuddled this whole question of regional government is. No matter how confused the general picture may be, we have got to

clear away the confusion from our own area and the actions taken by the OMEA have provided some time in which to do just that.

"If regionalism must come, and it seems it must, then it should come in an orderly manner. Those elected and appointed to attend to the interests of the general public or any special group of that public must meet on common ground to thrash out a planned program of unification," said Mr. Baldwin.

"Based on past performance, however, we can expect that each will present dissenting views to Queen's Park to the detriment of all."

Pointing out that the same disjointed situation holds true inside the utility field, the president admitted that everyone was at liberty to express his own views to the Minister of Municipal Affairs.

"My only admonition is that a collective voice in response to a request by the minister will surely carry greater weight and can only suffer by division. We are required to submerge our personal ambitions and to act together in not only accepting the regional concept but in making use of our knowledge and experience for the benefit of the electrical consumer," he said.

As to what the OMEA is doing about regional government, Mr. Baldwin reminded delegates that in Thunder Bay and Niagara, electrical commissions were the only commissions still in existence.

"I am convinced that this is because of the several representations made by the OMEA to the various regional government





*Among those who'll head OMEA District 3 for the coming year are (front) E. G. Caccamo, Schreiber, president; Jim Currie, Port Arthur, vice-president; A. J. Marshall, Fort Frances, vice-president. Back: W. H. Calder, Atikokan; E. A. Vigers, Port Arthur, secretary-treasurer; E. J. Hawthorne, Dryden.*



*Out in full force was this delegation from Dryden Hydro . . . George Schneider, sales, Mayor George Rowat, Chairman E. J. Hawthorne, W. M. Wake, secretary-treasurer, and Manager Fergus Brown.*

reviews, to the Department of Municipal Affairs and its ministers, and to the various other members of the legislature."

Mr. Baldwin closed with a challenge to commissioners to become informed of possible effects of regional government on the operations of Hydro in Ontario and to be prepared to make proper contributions toward the development of policy recommendations at the group's annual meeting next March. □



## atikokan - district 3

### 'think tank' delegates sweep away tradition

How will an operational area half the size of France with a population less than that of Hamilton fit into regional government? This was the question confronting delegates from the widely dispersed utilities in Northwestern Ontario when they converged on Atikokan for their annual meeting.

Staged at the Quetico Centre, a sort of community "think tank" located on 100 acres of woodland on Eva Lake, the conference broke entirely with tradition to tackle the thorny problems posed by regionalization. The meeting was divided into study teams which hammered out guidelines for dealing with regional government if and when it arrives in the Northwest.

Among the advantages of providing electrical service through fewer and larger utilities, they listed such items as economy of size, uniformity of marketing policies, computer billing, improvements in adminis-

tration, labor relations and training procedures. One of the chief drawbacks larger utilities was felt to be loss of the personal touch in dealing with customers and employees. An increase in the amount of red tape and the difficulty of financing takeover of rural customers from Ontario Hydro were also cited.

Two resolutions resulted from the sessions, one of which called on the Ontario government to recognize that plans for regionalization of electrical service should be the responsibility of the OMEA. It suggested that any such plans in the Northwest should be the result of decisions made by the people of that area in co-operation with Ontario Hydro.

The other resolution called on the OMEA to organize study groups in Northwestern Ontario "to formulate a course of action in the best interests of the people of the Northwest in the possible regionalization of electrical service."

Summing up, Cliff McIntosh, director of the Quetico Centre, told delegates: "I was impressed by the people in this system. Yours called the Hydro Family. It seems to me there is not a single other institution being regionalized that has your tradition, this unique relationship between the OMEA and the AMEU and Ontario Hydro."

Mr. McIntosh said he felt that no municipal structure in North America worked efficiently. The best kind of resources in any community were the people who voluntarily gathered together to work things out.

Throughout the meetings, delegates





er reporting on Ontario Hydro's progress,  
gional Manager K. N. Bodkin takes a stroll with  
an Viita, Atikokan Hydro's line foreman.



Talking things over are Port Arthur PUC delegates Jim Currie, commissioner,  
Ron Wilmot, chairman, and Sam Ashton, commissioner.

essed that when it came to regionaliza-  
n, Northwestern Ontario faced a com-  
tely different set of circumstances to the  
t of the province because of the vast  
tances involved.

Dr. R. H. Hay, of Kingston, said it was  
possible to derive one single pattern of  
regionalization that would fit all parts of the  
ovince. It was also becoming increasingly  
ar that in any two-tier form of regional  
gvernment, the electrical utilities should  
at the higher level.

The conference carried a third resolution,  
t forward by Port Arthur PUC, regarding  
Ontario Hydro news release which last  
ar announced an increase in wholesale  
wer rates but was interpreted in the local  
ss as an announcement that the PUC  
s raising its rates. The resolution asked  
t the matter of such releases be referred  
the OMEA's public relations committee.

## Power lines best in the long run

Ontario Hydro is spending \$100 million on  
transmission lines in Northwestern Ontario  
ause studies have shown it will be more  
onomical to import power from Manitoba  
d the eastern part of the province than  
ld on-the-spot generation.

Regional manager K. N. Bodkin told  
legates that the new lines will provide an  
0-mile 230,000-volt link from Sudbury  
he Manitoba border.

It seems to be a fairly common mis-  
ception here that the rest of the province  
lets the power resources of North-

western Ontario and that power will be  
exported to the detriment of this part of the  
province," said Mr. Bodkin. "Actually, if  
our load growth continues at its present  
rate, Northwestern Ontario will be a net  
importer of energy."

Mr. Bodkin said completion of the first  
stage of the line — between Wawa and  
Marathon — was the most significant event  
of the year. It had enabled emergency  
power to be obtained from the Great Lakes  
Power system on two occasions.

Electric heating had been installed in 108  
new and older homes in the region up to  
July, compared with 51 the previous year.  
Installations were down on the commercial  
front because of the drop in construction,  
but 1970 would see the opening of the all-  
electric Confederation College in the newly  
named city of Thunder Bay. The initial load  
would be about 4,000 kilowatts.

Mentioning the amalgamation next year  
of Port Arthur and Fort William and the  
annexation of Neebing and McIntyre town-  
ships to form Thunder Bay, Mr. Bodkin  
said the commissioners of the new elec-  
trical utility had already held preliminary  
meetings. In addition, a Hydro inter-  
municipal management committee had  
been formed to carry out some of the details  
involved in the amalgamation. □

## Keep information flowing, he says

Hints on public relations were handed out  
by incoming president E. G. Caccamo, of

Schreiber, who emphasized that the public  
utilities, along with other local administra-  
tors, shared in the development and welfare  
of the community.

"As Hydro commissioners, our function  
may appear largely autonomous," he said,  
"but autonomy does not imply lofty inde-  
pendence. Intelligent compromise and co-  
operation within the limits of our jurisdic-  
tion are essential to success."

Mr. Caccamo called for a better flow of  
information between the mayors and reeves  
on local utility commissions and the com-  
missioners themselves. He also warned  
against utility-council squabbles.

"No matter how provocative the situa-  
tion, personality clashes should never be  
allowed to develop. They can usually be  
prevented by sticking strictly to the issues  
and letting the facts speak for themselves.  
Nothing is so deflating to an overblown  
statement than a penetrating fact," he said.

Reporting on the activities of the AMEU,  
association president Jack Anderson, of  
Leamington, said that three courses for first-  
year linemen, one for second-year linemen,  
two supervisors' courses and three market-  
ing courses had been held. In all, they in-  
volved 126 people.

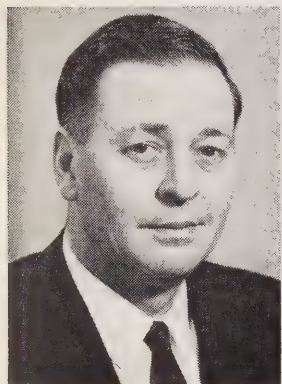
The association's Finance and Office Ad-  
ministration Board was studying the role of  
the computer in utility work. Several large  
utilities, including London PUC, were offer-  
ing a computer billing service to smaller  
surrounding utilities.

Mr. Anderson said that plans were under  
way for the 1970 equipment display, which  
will be held in Stratford. □

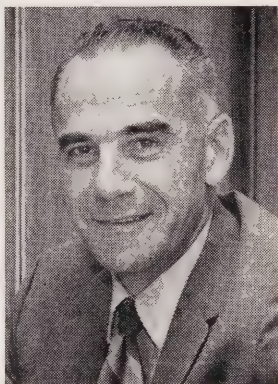


# along hydro lines

## New construction manager



Phil Stratton



George Estey

George Estey has been appointed construction manager of Ontario Hydro's Bruce nuclear power station, on the east shore of Lake Huron. He holds a similar post at Lambton generating station, now nearing completion 14 miles south of Sarnia.

Mr. Estey succeeds Phil Stratton, who is joining a Toronto firm of management consultants.

A graduate in electrical engineering from the University of New Brunswick, Mr. Estey was involved in the construction of Otter Rapids, Lakeview, Lambton and the Robert H. Saunders-St. Lawrence generating stations. He has more than 20 years' Hydro service. For the time being, he will be construction manager at both the Lambton and Bruce stations.

Before his appointment at the Bruce station, Mr. Stratton was construction manager at Pickering, the 2,160,000-kilowatt nuclear plant being built east of Toronto. He was earlier construction manager at Douglas Point nuclear station, which adjoins the Bruce site. □

## Falls revisited

This year marked the 25th anniversary of the Canadian Electrical Manufacturers Association. And to make it a special occasion, the group returned to Niagara Falls — scene of its formation — for the 1969 annual meeting.

The association was formed in 1944 in anticipation of the tremendous transition within the electrical industry from the war effort to normal markets.

At the end of the war, the electrical apparatus and supplies industry in Canada had an output of \$230 million from 247 plants. It employed about 44,000 people. Last year, output hit \$2.3 billion and there were 127,000 employees in the industry.

Over the years, changes in the organization have taken place.

The appliance portion of CEMA is now centralized in Canadian Appliance Manufacturers Association. The promotional arm is the Electrical Bureau of Canada. It was formed to help to plan, promote and conduct industry-wide programs such as Medallion Home certification, Housepower, Plantpower, F Better Electrically and National Electrical Week.

The challenge of selling to other countries, which was issued at the first annual meeting, has not been ignored. In the past decade, exports from the industry have increased tenfold to reach \$281 million worth of goods.

And the future? K. H. Rapsey, president of CEMA, predicted that output may reach \$6 billion by 1980.

## Schoolboy heroes

Two Port Credit teenagers who pulled three men from Lake Ontario near Lakeview generating station last June have been honored by Ontario Hydro. Ralph McMillen, 14, and Billy Lawrence, 15, received a reward from Chairman George Gathercole.

Ralph first saw the men in a boat about 3,000 feet offshore near his lakefront home. The waves were three to four feet high and a moment later both men and boat disappeared. Ralph grabbed a pair of binoculars and saw the men clinging to their capsized boat.

Despite the rough water, Ralph and Billy launched a 12-foot boat and managed to rescue Kenneth Gray and Bruce Burbridge of Hydro's generation projects division, and the boat operator Robert Freeman. The trio spent about 15 minutes in the water. Back on shore, the boys took the three men to the home of their neighbors, Helen and Fanny Birdsall, who fed them and changed out their clothes.

An accident prevention division official who investigated the incident said the boys showed "the ultimate in initiative, courage and resource."

## Nothing like it

It's one thing having an idea. It's another putting it into practice. Engineers in Ontario Hydro's civil design department know only too well after sweating over the vacuum building at Pickering nuclear power station for about five years.

The basic idea of the building — in effect, it's a huge safety valve — was provided by Atomic Energy of Canada Ltd. Toronto was, nothing like it had ever been designed or built before.

"We spent about six months tracking down any literature we could," says Clair Haines, who headed the design team. "There was just no precedent to go on."

Pressure in the vacuum building will be maintained at one pound per square inch compared with normal atmospheric pressure of 14.7 pounds. In the unlikely event of an accident involving the nuclear reactor or primary heat transport system, any escaping radioactive material will flow into the vacuum building rather than leak into the atmosphere.

Among the difficulties encountered was the problem of supporting 2.5 million gallons of water at the top of the structure. This water would douse the gas-steam mixture entering the building in the event of an accident. The solution was to support the roof slab and water tank on 61 reinforced concrete columns four feet in diameter. The perimeter wall, which could never withstand the stress, is sealed against the roof slab but is structurally linked.

Other problems involved the effect of wind on an evacuated structure, bearing in mind its 159-foot height and 530-foot circumference. And, although they're virtually unknown in this part of the world, the building had to be capable of withstanding earthquakes. Hydro's research engineers were called in to check the permeability of the concrete to ensure that air wouldn't leak through the three-foot thick walls and destroy the vacuum.



All this and the building may never be used. Chances of an accident are put at once in 1,000 years. Just the same, it's reassuring to know it's there. □

## municipal briefs

**Tree-lovers of London** were called to the rescue by the local PUC during a late summer dry spell. The appeal was issued by the PUC's parks director Maurice Chapman on behalf of 12,000 saplings planted on city streets during the last two years. Mr. Chapman told citizens that department tank trucks couldn't get to the trees. He suggested that residents pour two pails of water around the base of a tree at least twice a week.

**Windsor** Alderman Thomas Toth has lost his campaign to have the electorate decide whether the Windsor Utilities Commission should be abolished and its functions transferred to city council. At a recent council session Mayor W. C. Riggs cast a deciding vote to turn down a notice of motion which would have put the question on the December ballot. The issue was first raised several months ago and was disregarded by council at that time. Ald. Roy Moore, who led the debate opposing the motion, said: "We have a good and loyal commission and council already has enough work to do."

**North Bay Hydro** has announced that its newest substation will be named after J. W. Chapman, present commission chairman. The naming is in line with a policy of using chairmen's names. Mr. Chapman was a member of Widdifield Hydro commission before amalgamation with North Bay and is manager of Northland Trust. **Windsor Hydro** has gone underground in a big way. The utility recently put a 27,600-volt local distribution system entirely underground. It is believed to be the first such system in Canada. Located in Peachtree Village, the system consists of seven below-ground transformers serving 80 units. James Evans, assistant general superintendent, says the network will eventually be extended to serve an area of 20 square miles.

**Windsor** will be the site of the AMEU's vehicle and equipment show next May. The last show was in Barrie in 1968 when 60 firms put more than \$2 million worth of equipment on display. Earlier shows, held every two or three years, have been at Scarborough, Niagara Falls and Etobicoke.

**Dunnville**, safety in PUC operations is getting to be a habit. The electrical department has received recognition of a 19-year accident-free record. About the same time, the American Water Works Association gave the utility an award for an accident-free year in the water works department.

**According to Toronto Hydro's** annual report, the system's peak load increased 5.8 per cent in 1968 to reach 872,000 kilowatts. Energy sales were up nearly six per cent. One of the big gains for the utility was in electric heating. Six new all-electric apartments with 1,500 suites were completed during the year.

## Up, up and away

**Toronto Hydro** Chairman George Gathercole, speaking to Toronto's Building and Development Committee, said that construction of a 700-foot stack at the R. L. Hearn power plant would reduce "ground-level concentrations of sulphur dioxide attributed to the station by about 90 per cent in downtown Toronto and the area east of the plant."

He said a higher stack reduces pollution by achieving greater dispersal or dilution, thus holding ground-level concentrations at acceptable levels. The chimney, which would be Hydro's tallest, meets the standards of the provincial Air Management Branch and has the approval of the federal Department of Transport.

Mr. Gathercole was invited to talk to the committee about the stack, which is planned for completion in 1971 at a cost of \$8.7 million. It would replace the present eight chimneys — five 200 feet high and three reaching up to 300 feet. The station generates about one-tenth of the province's power requirements.

Including the cost of the proposed stack, Hydro will have spent nearly \$20 million, or about 12 per cent of the Hearn station's capital cost, on air pollution measures.

The plant burns a low-sulphur content coal while electrostatic precipitators are used to remove most of the solid wastes. □

## Doesn't give a hoot



*Not so wise*

Eating dinner up around Nipigon can be downright fatal — if you choose the wrong spot. The victim in this case was a great horned owl.

According to Garf Evans, a lineman for Nipigon Hydro seen here with his wife and son, the owl had just caught a four-pound muskrat for dinner. It flew to the nearest perch — a 35-foot utility pole — and landed on the centre phase insulator of the 4,160-volt line. Having trouble with his footing, the owl decided to move down the crossarm. There was a flash and that was the end of the owl.

Moral of the story: never eat dinner on a 4,160-volt line. □

## On the nose

Development of nuclear power is Canada's greatest peacetime science program, according to Dr. O. M. Solandt, chairman of the Science Council of Canada.

One of the nation's top scientists, Dr. Solandt was speaking at a luncheon on "Science in Canada". He told guests: "When speaking of major programs in the field of science and technology in Canada, nuclear power undoubtedly heads the list."

"Our efforts have followed the logical but risky course of putting all our money — about one billion dollars — on one horse . . . the heavy water-moderated natural uranium reactor. Because we have limited our attack to a narrow front, we have been able to keep well up to the world leaders in the field."

"Despite misgivings, the chances of our having backed a winner have never been better," Dr. Solandt said.

"Many knowledgeable people and agencies throughout the world, especially in the United States, are now reconsidering their own progress and are looking with approval at the attractions of Canadian reactors. This is certainly not the time to hedge our bets, but rather make sure that we maintain our pace now that success seems to be in sight," he added. □



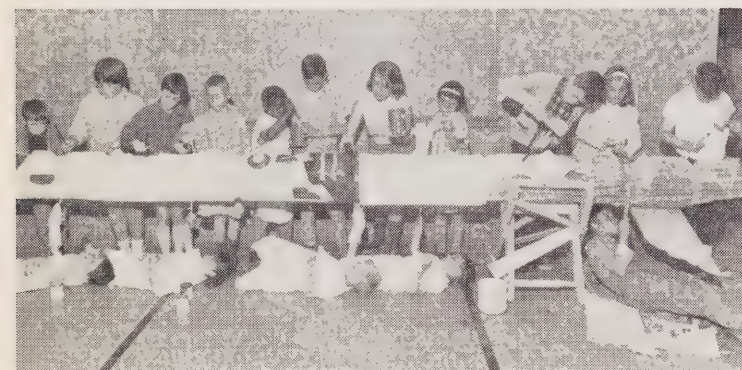
## Jobs switch

W. S. (Stan) Taylor has been appointed consumer service and sales engineer for Ontario Hydro's Georgian Bay Region. He succeeds H. R. Graaf, who took early retirement after 39 years of service.

Mr. Taylor graduated from the University of Toronto in 1950. He joined Hydro the same year as a junior engineer and shortly after was attached to the frequency standardization program. In 1953, he was named industrial engineer for the program and two years later assumed the post of consumer service superintendent in the old Niagara Region. When the Niagara and West Central regions were amalgamated in 1961, he assumed a similar position in the expanded region.

In another jobs switch, I. C. Bridgnell has been appointed consumer service superintendent in Hydro's Central Region. He has had varied experience in consumer service work at Ottawa and head office. He has been consumer service supervisor in Central Region since the beginning of 1968. □

## Pole paint-in



Old woodenhead

Amateur Rembrandts and Moores at Parkdale Public School in Hamilton got a long, tall model to work on. Hamilton Hydro donated the model — a power pole — and Hamilton Street Railway, which owned the bus that knocked it over, donated the paint. The youngsters turned the 25-foot chunk of wood into a seven-headed totem pole. It's topped off with the traditional thunderbird — the mythical god of lightning and thunder. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Communications and the younger generation posed a problem for Brampton Hydro earlier this year when the municipal council agreed to pass a Hydro-supported by-law prohibiting signs or announcements on utility poles. The poles were often used as notice boards to publicize dances and other events for the under-twenties.

To compensate for the loss, Brampton Hydro arranged with The Daily Times and Conservator newspaper to run a column each Monday listing events for young people and chatting about other subjects of youthful interest. Written by a reporter already oriented to youth groups in town, the column is sponsored by the utility as "a service to youth." Copy is prepared and edited by the newspaper without reference to the sponsor.

"Apart from one item that commented rather critically on recreational facilities in Brampton, the column has not embarrassed us," reports Hydro manager Vern Breen. "We also

know that the young people are well aware of our participation and seem to appreciate it."

\* \* \*

North Bay Hydro attracted favorable editorial comment in July for its 1968 annual report to customers. The North Bay Nugget called it "one of the most appreciated items received through the mail recently". The editorial continued: "It was a concise statement and it told consumers exactly how their money is being spent."

Low cost, widely distributed annual reports have been used by many Hydro utilities across the province during the last two years. To assist in their preparation, the OMEA-AMEU Public Relations Co-ordinating Committee produces a suggested draft and distributes it to every municipal utility each spring. In its own special way, a brief annual report helps to answer the question "What do you people do with the money I pay you?"

\* \* \*

The Windsor Utilities Commission has agreed to set up a public relations program with a \$10,000 budget. The program consists of newspaper and radio advertisements, as well as participation in the City of Windsor annual report. Other items include school book covers; participation in public speaking contests; distribution of films and slides covering utility activities.

Also part of their year-round program are student-bursar awards, safety films, career counselling, employee training, plant tours and periodic meetings with civic authorities to discuss common problems.

Windsor also intends to participate in a "Career Exposition" sponsored by the Board of Education, the Windsor and District Labour Council, and the Chamber of Commerce. The public utility will have a booth with officials on hand to explain the workings of the commission and career possibilities. Like most other utility operations, a "Tell the People" program can be best carried out with careful planning and continuing activities within the community.

## Until 1975

The Electrical Utilities Safety Association has launched a five-year program, according to manager Harry Flack.

"During the past two or three years there has been much confusion concerning the future training program and indeed the entire role of the association in the utility industry," says Mr. Flack.

"In order to clarify the situation, the directors have authorized a five-year training plan consisting of developmental courses for supervisors, linemen and other utility workmen." Some existing courses will change in the updating process, but basic courses now offered will continue to be available according to demand.

Mr. Flack added that the step was taken after assurance from the Workmen's Compensation Board that control of the EUSA program will remain in the hands of the membership. The board is responsible for EUSA and other safety groups in the province.

## August energy production

Primary energy provided by Ontario Hydro in August totalled 4.49 billion kilowatt-hours, an increase of 5.1 per cent over the same month a year ago. For the first 8 months of 1969, the total is 39.04 billion kilowatt-hours, up 7.4 per cent over the same period last year. Adjusted for seasonal influences, primary energy demand in August was 4.90 billion kilowatt-hours, 2.40 per cent less than the previous month. The seasonally adjusted total for August represents 58.83 billion kilowatt-hours at annual rates. This is 422.92 per cent of the energy demand in 1949. □





## as don wright sees it

Among the many comfortable and familiar accoutrements of day-to-day living now on the way out as the result of the computer are the charming cheque and the gracious greenback. Experts are calling for a chequeless and cashless society in which all transactions of a monetary nature will be handled by the guy with the electronic brain. While this may be just a logical extension of the process initiated by government to relieve us of decision-making in matters relating to the distribution of our incomes, the politicians have been screeching enough to let us keep the odd inflation-tattered dollar. The computer will render us penniless.

Another frightening step down the road to complete electronic subjugation is reported from California where a self-repairing computer is on the launching pad. Employing a central unit to detect malfunctions, this precocious bit of hardware puts the finger on its ailing vitals and orders the parts it needs to repair itself.

Special computers for programming other computers are just around the corner and it won't be long before some mechanical upstart stumbles on the one factor which is really surplus to the whole efficient business — us.

Man has had things all his own way for a very long time and over the years his faculty for sniffing out danger has grown rusty. Only lately have his instincts begun to quiver in the direction of the computer. Among the first to take action is a London group claiming 1,500 members and calling itself the International Society for the Abolition of Data Processing Machines.

Shunning the club and the axe as too primitive an approach to so sophisticated an enemy, this organization has developed a clever *modus operandi* with which to avert our digital doomsday. Computer card roulette is one of its weapons. This involves careful tampering with the card in such a way that it remains acceptable to the machine but produces results reflecting discredit to the whole computer family — yea unto the third and fourth generation.

Another underhanded ploy being advocated by ISADPM involves the use of the femme fatale. Aware that computers operate effectively only in very clean air and that they are sensitive to environmental changes, the group suggests that female data processing staff be induced to use lots of the cheapest perfume they can find

while on the job. This approach, they would have us believe, can unhinge a computer bank just as effectively as it works on a weak-kneed male office worker.

At best, these tactics can only delay the day of reckoning. What's really needed now is a high-powered public relations campaign to convince the computer that people are nice to have around even if they aren't very useful. We could point out, for example, how our dogs and cats and little white mice fulfil a similar but no less vital need.

■ One of the best public relations devices ever developed by our Line Maintenance Department is undergoing the final touches and will soon be listed as a standard item in Hydro's equipment catalogue — it's a pussy snatcher.

It all came about as the result of a worsening dog-cat-pole situation wherein frightened felines seemed to be seeking refuge high up among the power lines with increasing frequency. These little episodes may not be considered matters of any great urgency, except by the cats, but they tend to develop into neighborhood disasters because of the human element.

Invariably, the cat belongs to a youngster whose distress commands attention from blocks around. And after two or three days of playing ring-around-the-rosy with the Humane Society, Hydro and the fire department, the citizenry is likely to take the matter into its own untrained hands and effect a rescue — sometimes with disastrous results.

Policy in these situations is set by the local electrical people who sometimes decline to act



on the grounds that no lineman should be asked to risk life and limb for the sake of a cat. "Leave it alone and it will come home," has sometimes been the philosophy without too much regard for the second line of the couplet, "dragging our image behind it."

Kat-Katcher IV should alleviate the situation and provide the boys with an opportunity to make like the US Marines without fear of reprisal occasioned by an inability on the part of the victim to appreciate the full implications of its predicament.

Essentially an adjustable loop which can be manipulated from the reverse end of an insulated stick, the device came through with flying colors at a recent trial and won the blessing of a Humane Society representative who attended the demonstration. It would normally be used from an insulated aerial bucket.

Model shown in the photograph is a prototype, but the cat is the real thing. "Easy does it lads," he seems to be saying, "I don't dig that nine lives jazz."

■ Few of Hydro's operational tools are more versatile than its ubiquitous helicopters which are, on occasion, required to work in the public weal on matters quite unrelated to the production of power. They're mighty helpful in fighting forest fires and have established quite a reputation for finding lost boaters and hunters.

One of their most unusual assignments was carried out this summer when they were asked to assist township police in Northwestern Ontario in tracking down a nude man reported to be lurking in the vicinity of a local high school. They were unsuccessful in this instance and soon returned to the more mundane task of transmission line patrol.

No doubt the crew did its best, but one can't help wondering whether or not a more persistent search might have been carried out if the nudist had been of the opposite sex.

■ Confirming the rising price of copper, thefts of wire from power lines across the province and beyond continue to filter across our desk. In one instance, a householder deprived of power in the wee small hours went outside to investigate and was reassured by the thieves that they would soon have the trouble fixed and the power back on!

And a Manchester policeman was able to apprehend a gang of copper thieves thanks to his sound appreciation of English work standards. He became suspicious after watching the men ostensibly repairing a road in broad daylight. Hauled before a court, they all drew stiff fines for stealing underground electric cable. The officer twigged to the caper because the men were working too hard.

Elsewhere in England, a thief literally bit off more than he could chew in attempting to steal copper wire from a live 3,000-volt line. Police investigating the incident came across a complete set of false teeth which they traced to the owner. He admitted they had been jolted out by the shock he received from the line.

■ But English electricity seems to be different. Consider the curious case of an abandoned hotel in Yorkshire. Elevator doors continued to slam shut, lights flashed on and off and the car rocketed up and down its shaft even though inspectors investigating the phenomena attested that all electrical supply to the building had long been shut off.

In Suffolk, a policeman reported that whenever he switches on his immersion water heater in his new house, it makes a neighbor's telephone ring.

Strangest of all, perhaps, is the argument advanced by a Yorkshire representative of the National Coal Board. In the course of an address urging greater efficiency in coal production, he is said to have remarked that the energy produced by nuclear plants was in no way comparable to the electricity turned out by coal-burning plants.

He seems to be suggesting that electricity produced by nuclear fission is pale and anaemic in comparison with the rich and full-blooded stuff made from burning coal. Maybe it's radioactive as well!



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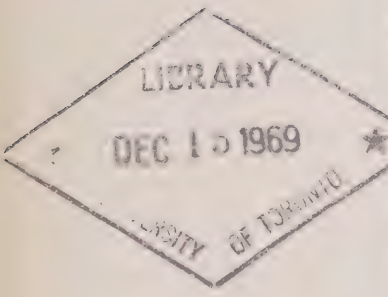
ONT

So there's a line overhead. There may be one underground. It's always worth a call, just to check. Remember, Ontario Hydro and the municipal utilities are interested in YOUR safety





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wide, wide field of magnetics • the ABC of QA • wilderness harvest

**ontario hydro news**  
november/1969







**news**

**november/69**

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### the cover

Billions of tiny ferrite cores are produced each year for computer memory circuits. In effect they're tiny magnets – just part of a continuing revolution in the discovery and application of new magnetic materials (see opposite).

### editorial board

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## the friendly dragon

Asked to pin-point the most serious immediate problems facing Canada as it enters the 70s most people would probably list separatism, pollution, medicare and other problems ahead of inflation.

Some might make room for it through a vague sense of uneasiness, but the mounting tide of warnings by economists, bankers and industrial leaders appears to be shrugged off all too casually. The tendency, we suspect, is for all except those on fixed incomes to regard inflation as a kind of friendly dragon because it operates in the guise of prosperity and cavorts in a carnival atmosphere of soaring wages, unrealistic interest rates and high price tags.

Take, for example, the primary steel sector where hefty wage increases were followed with alacrity by higher prices. The merry-go-round will continue, of course, until all major steel users adjust their price structures in accordance with the new cost of production.

Autos and refrigerators are the kinds of commodities most obviously affected in this instance, but the ripples from the increase will spread out as far as the electricity people use to cook their meals and heat their homes. As a major customer, Hydro must play its part in meeting higher steel industry wages. And to do so, it must call upon the people who buy electricity – its only source of revenue.

Prices chasing wages in a senseless bid for a temporary advantage is only one aspect of the inflationary cycle. Interest rates are another alarming facet.

Afflicted with inflationary psychosis, people and institutions are not going to tie up their money in long-term investments at moderate rates of return if they foresee their gains being erased by continuing deterioration in the purchasing power of the dollar. Higher and higher interest rates are necessary to attract investors during a prolonged period of inflation and this adds enormously to the cost of doing business.

On its most recent \$50 million bond issue, for example, Hydro had to pay 8½ per cent. This compares with rates which averaged 4 per cent in the 50s and 6¼ per cent in the 60s.

Even one per cent is significant to an enterprise whose capital requirements continue to mushroom in the face of a relentless rise in the demand for power and the consequent need for additional facilities.

Hydro's construction costs in 1965 totalled \$150 million. Estimates for 1969 indicate that over \$400 million will be spent on construction. These costs are expected to total \$488 million in 1970.

One per cent on \$350 million over a 20-year period works out at more than \$70,000,000 – all non-productive as far as Hydro construction is concerned.

Fortunately, Hydro's record of efficiency has been such that its rates can be raised while electricity in the province remains one of the greatest bargains available. At the same time, unbridled and prolonged upward pressures could eventually undo all the good work of the past.

Inflation is, of course, an international problem of the utmost complexity, but the sooner we strip off our rose-colored glasses and regard it as a dangerous monster without benevolence or any other redeeming quality, the quicker we can bring it to heel. And it would be difficult to assign too much priority to the measures necessary to regain our stability and resume real economic progress.



*they've got*

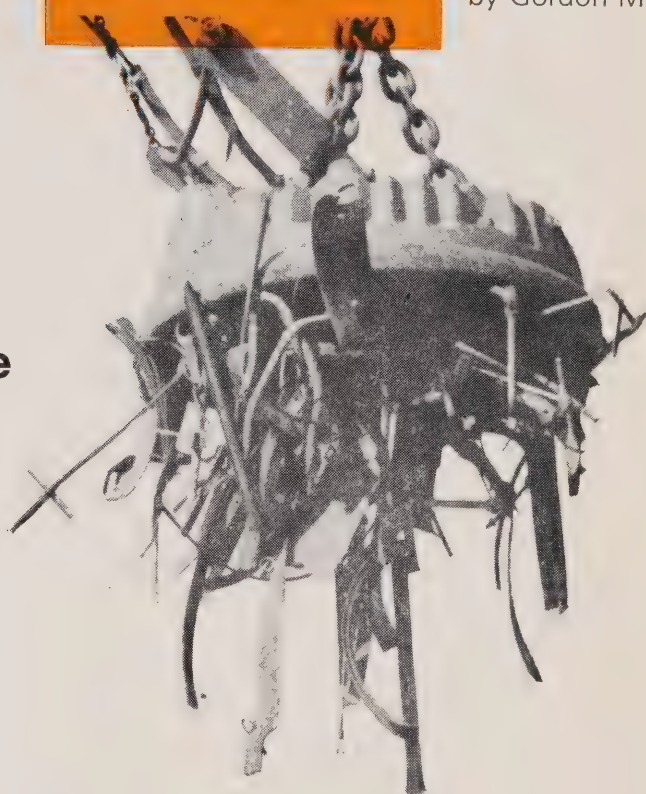
**TO**

by Gordon Murphy

**... and whether they're in computers, generators or giant particle accelerators, we've come a long, long way from the humble horseshoe magnet.**

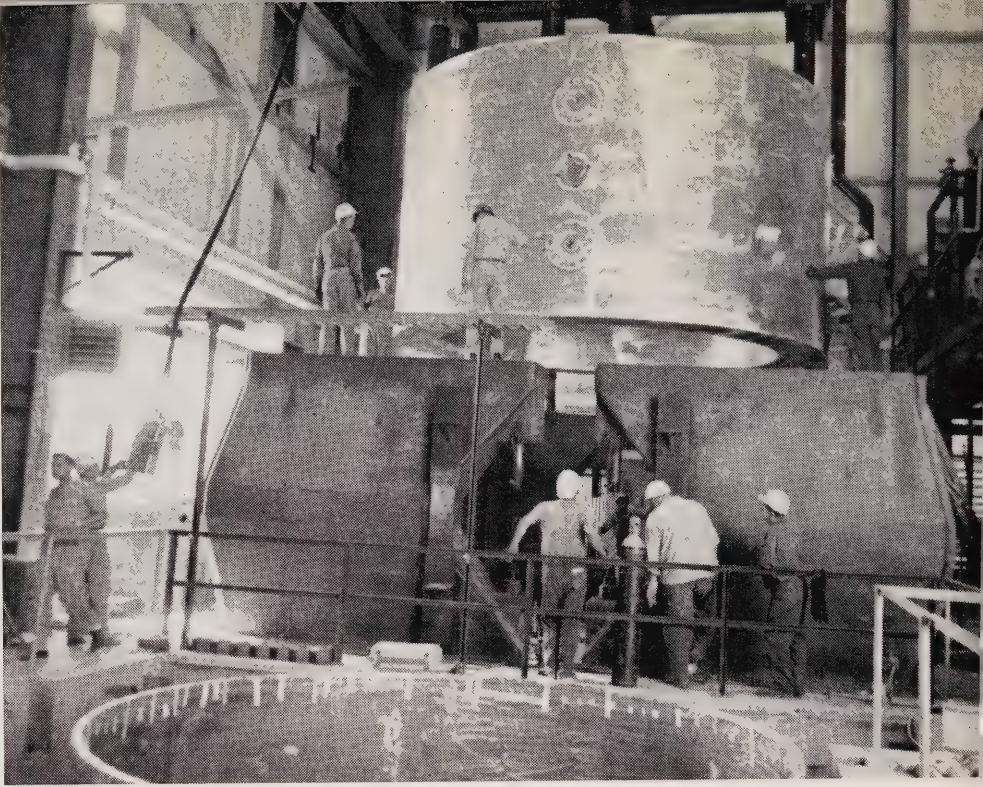
When scientists embarked on the now historic Manhattan Project, they built what at that time were the world's most powerful electromagnets.

Designed to separate the isotope uranium-235 for the first atom bomb, the magnets incorporated more than \$124 million worth of silver borrowed from the US treasury for use in bus bars and windings. All available copper was needed for the war effort, but silver is an even better conductor of electricity.





*Coils of the world's largest superconducting magnet are lowered into their steel yoke at the Argonne National Laboratory, near Chicago. Intricate patterns are traced by ferrite cores, used by the billion in computer memory circuits. Comparison with a needle provides a good illustration of their size.*



The electromagnets were about 100 times the size of any previously built. Because their attractive force made working with normal tools difficult, kits of non-magnetic tools were developed.

This means of enriching uranium was later superseded by the diffusion process. The magnets were taken apart and the silver returned to Uncle Sam's vaults. But the science of magnetics has soared to new heights of sophistication, particularly in the field of high-energy physics.

In December of last year, work began on the world's most powerful particle accelerator at Batavia, Illinois, in which numerous magnets will hurl a stream of protons around a ring-shaped tunnel a mile-and-a-quarter in diameter. A 500-foot-long linear accelerator building and a circular booster 500 feet in diameter will give punch to the high-energy particles before feeding them into the main ring.

Nearly 50 universities will use the accelerator for nuclear research. Operating costs may run to \$60 million a year, but it is confidently expected that startling new phenomena will be revealed from bombarding elements in this giant atom-smasher.

No one is more aware of this than Dr. Glenn Seaborg, chairman of the US Atomic Energy Commission, which is behind the \$250 million installation. "Each time a new regime of energy has been entered, a wealth of new phenomena has been revealed, and we have come closer to an understanding of the forces at work in the nucleus," he says.

In a further attempt to unearth the secrets of the microcosm, the AEC recently completed tests at its Argonne National Laboratory near Chicago of a powerful superconducting magnet.

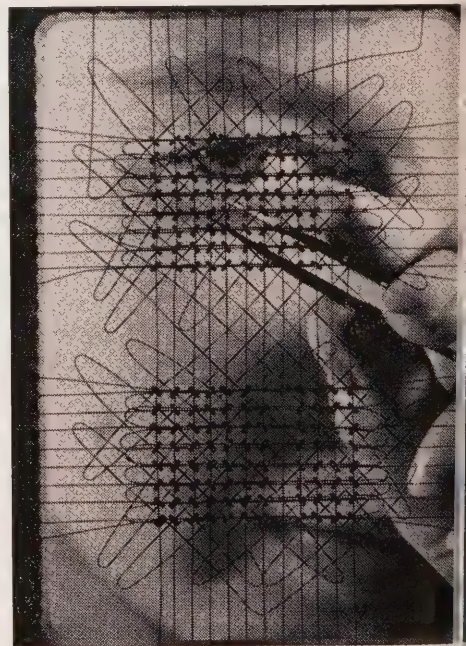
Cooled by liquid helium, the magnet's superconducting coils lose all resistance to electrical current around minus 451 degrees Fahrenheit. This enables it to run on a very small amount of electrical power.

Initially, the magnet is charged with a 10-volt, 3,000-amp supply. After that, the only electric power needed to keep the magnet in operation is consumed by its 250-horsepower refrigerator unit. A conventional magnet of this size would consume enough power to supply a town of about 10,000 people.

Closer to home, McGill University is building the world's most powerful research magnet at Longueuil. Working at extremely low temperatures, the main installation will be only the size of a kitchen stove yet will create a magnetic field 1,000,000 times greater than that of earth.

Total cost of the new laboratory will top \$900,000. The National Research Council has provided \$651,000 and financial support was also received by the university from Canadian Liquid Air Ltd., which designed and built the cryogenic equipment. Dr. W. B. Lewis, senior vice-president of Atomic Energy of Canada Ltd., donated the \$32,500 he won as a US Atoms for Peace award.

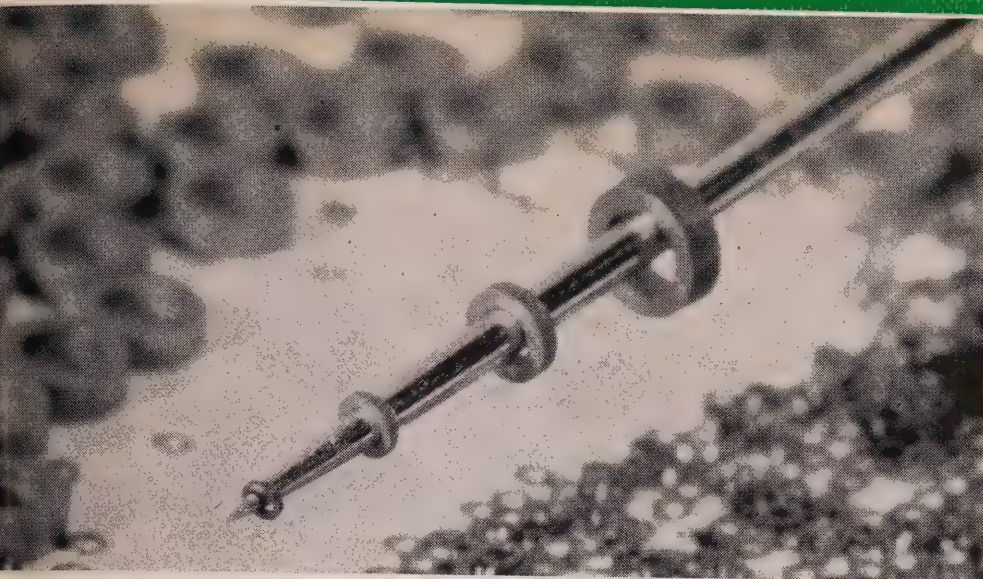
Superconducting magnets may well play an important role in the development of magnetohydrodynamics — the generation of electricity by passing a stream of ionized gas at high temperature through a magnetic field. Because the gas acts as a



conductor and creates a current as it passes through the magnetic field, successful application of MHD theory would eliminate expensive moving parts from electrical generators.

Although the elementary properties of the magnet have been known for sex thousand years, scientists are the first admit they do not completely understand the interactions between magnetism a matter. There are, they say, more quest than answers. But developments in rec





years have been such that the annual value of magnets produced in North America is close to \$700 million.

In everyday life, we're surrounded by them. Up to 30 can be found in the average home — in telephones, electric clocks, refrigerator doors, all manner of electric motors and radio and television loudspeakers. Outside the home, they help generate electric power, turn speedometers, store information in computers and perform myriad other tasks.

Man's first magnet was the ancient lodestone. As far back as the third millennium B.C., Chinese legends made vague references to instruments which indicated north. But there's no definite evidence of the earlier use of the magnet for navigational purposes in China than in the west, where the compass appeared around 1200.

Thales of Miletus experimented with magnets several hundred years before the birth of Christ. Indeed, the word itself is of Greek origin and probably referred to Magnesia in Asia Minor, a source of flintstone.

Not until 1819 did a happy accident show that an electric current always produces a magnetic field. It was discovered that when a weak current passed through a tightly packed coil of wire will create a powerful magnet. The electromagnet had arrived.

With the invention of the electromagnet, a door was opened for the almost immediate development of the electric motor. Faraday followed this up in 1831 with the electric generator.

Magnetic materials are classed as either hard or soft, definitions that have no bearing on the temper of the metal but relate to

its ability to retain magnetism. Hard materials are difficult to magnetize, but retain their properties of attraction well. Soft materials are magnetized easily, but quickly lose their magnetism. Hard materials are naturally used for permanent magnets; the soft ones go into such products as electric generators, transformers and motors.

Up to 30 years ago, permanent magnets were made almost exclusively from carbon steel. However, this has been superseded by alnico — an alloy of aluminum, nickel and steel — ceramic magnets and even magnetized ferrite-impregnated plastic.

Without any giant atom smashers on the drawing board, Canada is unable to put magnets to such dramatic use as in the United States. Plans by Atomic Energy of Canada Ltd. for a \$150 million Intense Neutron Generator (ING) were shelved last year because of costs.

Like research accelerators in the US, ING's giant magnets would have guided a high-energy stream of protons on to a liquid metal target to release neutron particles in an effect known as spallation. But ING would have consumed as much electricity as a city of 100,000 persons. Operating costs would have run to \$21 million a year.

However, new applications for magnets are forever coming on the Canadian market. Researchers at Canadian Westinghouse, for example, have devised a technique that employs electromagnets to position fuel rods in nuclear reactors.

Other more mundane developments at Westinghouse include a non-contacting switch for mine conveyors — a safety device which uses electromagnets to make and break the power to the system. The

switch overcomes problems of arcing and corrosion, both long-standing bogeys in the mining industry.

Canada's market for alnico magnets is pretty well dominated by Canadian General Electric, which supplies about 95 per cent of such devices used in this country. Leading the list are alnico magnets for telephones, electric clocks and radio and television loudspeakers, accounting for between \$1.5 and \$2 million a year.

"We also do a considerable export business in permanent magnets," says a company spokesman, "a large part of it in the United States."

Magnetics entered the ever-widening world of computers by way of the memory core, of which between 15 and 20 billion are produced annually in North America from ferrite materials. Shaped like minute doughnuts, the cores are wired like beads into frames of thousands of units. Each core can be individually magnetized or demagnetized, that is, turned on or off. It is this quality that enables them to store vast quantities of data.

Ferrite cores rank high with computer manufacturers because they provide quick access to the stored information, are relatively inexpensive and require no power for stand-by. Yet they are being challenged by other memory systems, one of which makes use of magnetic materials deposited on film. IBM recently unveiled a film memory system in the US with an access time of only 60 billionths of a second, but the search continues for faster and more compact systems.

Even minute magnetic bubbles may provide compact and inexpensive data storage for computers and telephone switching equipment, according to Bell Telephone researchers. The bubbles — locally magnetized areas — can be created, erased and moved anywhere in thin sheets of magnetic material without interconnection. They are the basis of a new technology now being explored at Bell Telephone Laboratories at Murray Hill, New Jersey.

The lowly horseshoe magnet has come a long way from being merely standard equipment in the pocket of every small boy. Indeed, they say in the industry that its future is limited only by the imagination.

It's an attractive possibility. □



*wild*





# rice

**Gourmets will pay up to \$6 a pound for its ambrosial flavor. But the once abundant harvests that gave Rice Lake its name are now little more than a memory.**

heads of Indian reservations in southern Ontario must deal these days with a welter of community questions. And Ralph Loucks, 58, chief for the past 18 years of Hiawatha Indian Reserve on the north shore of Rice Lake, is no exception.

During his spare time away from a regular factory job in Peterborough, 15 miles to the northwest, Mr. Loucks must ponder such demanding problems as modern housing, sanitation, land leasing, improvement plans and education.

All these matters and many more leave him little time for dreaming. But dream Mr. Loucks does each mid-September of the more leisurely days of his youth. Of the days when Rice Lake lived up handsomely

to its name, and contained the richest beds of wild rice in eastern Canada.

Up to 1910, the lake was so covered with stands of wild rice in early fall that only a narrow steamboat channel along its 25-mile length and the outflow approaches of the Otonabee and Indian feeder rivers were navigable to large boats. Canoeists, standing upright in an attempt to find their bearings, often became hopelessly lost.

The Hiawatha Indians and tribesmen at Alnwick Reserve on the south shore of the lake harvested tons of wild rice each mid-September for themselves and for sale to gourmets. Migrating wildfowl appeared as clouds of faint smoke while feeding each morning and evening on the rice

beds. And gunners kept up a thundering barrage at the birds until November freeze-up.

Those dream days of abundant grain, the fattened wildfowl, the comradeship and cash from the harvest are long gone from Rice and other compatible waters in the Kawartha region. The causes of its disappearance are due to acts of man and God.

A century of changing water levels in the Trent Canal system was partly responsible. Then a disastrous July hurricane in 1928 ripped the tender plants from their beds and left them rotting on the shores. And during the past 20 years, an infestation of trash carp rooting through the beds has made the harvest of the good



seed — men-o-min, the Ojibwas call it — a yield of yesteryear.

Well, almost. Local Indians occasionally glean a little grain from the few isolated patches of wild rice that remain hidden in little-used waterways. And Chief Loucks, who stores a 50-pound sack in his woodshed — he and his mother picked the rice in 1949 — hopes to save most of the seed to sow a comeback crop in Rice Lake.

The chief doles a little out of his private stock on special occasions when his reactivated taste buds turn on the memories of leaner childhood days when the family was served wild rice as “porridge for breakfast, in soup at noon and as a pudding at suppertime.”

Although most non-Indians know little if anything about wild rice, let alone having ever tasted it, they nevertheless show more than a passing interest in the plant. If for no other reason, they cherish its harvest as an Indian ritual and therefore a folklore to be preserved.

Most of Ontario's wild rice is harvested in Northwestern Ontario, particularly around Kenora. Production depends almost entirely on water levels and therefore varies enormously from year to year. In 1963, for example, local Indians harvested 57,000 pounds of green rice in the northwest. In 1966, the figure fell to about 40,000 while in 1967 — a bonanza year — it leaped to a staggering 562,000 pounds. The crop is sold mainly to local merchants and is then dispatched to Winnipeg for processing. It is eventually sold to gourmets for up to \$6 a pound.

Just what is wild rice?

*Zizania Aquatica* is an annual water plant of the large family of grasses. It sheds its seeds into the water in autumn where they lie in the mud throughout the winter and germinate in the spring. The first growth appears as ribbon-like leaves floating on the surface, the plant's lifeline to the sun.

If fluctuating water levels submerge the floating leaf the plant will not produce seed even though the main stem is pushing up from below, rising from two to 10 feet above the surface.

In normal growth, the male and female flowers appear together on each stem. They are cross-fertilized by the wind. The grain is harvested or falls in mid-September into the acidic mud where a percentage



may lie dormant for two or more years before sprouting. Withered plants locked in the winter ice are yanked out by ice movement in spring, which also cultivates the new seed bed.

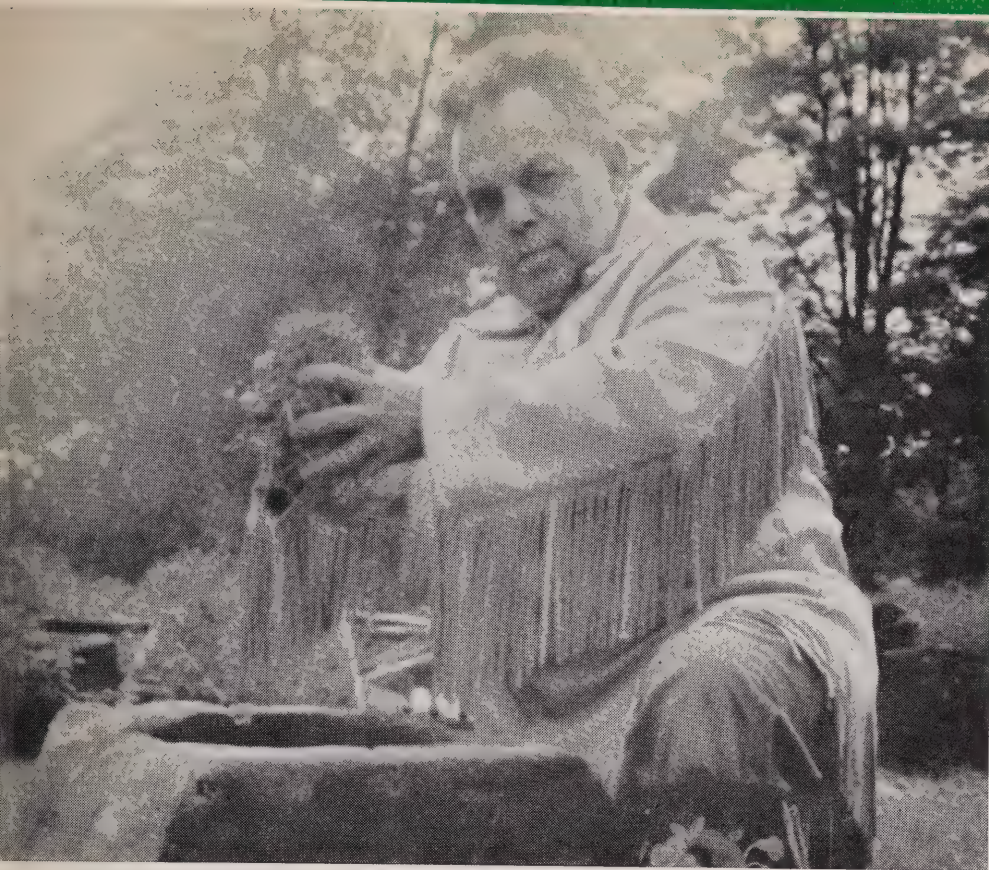
Wild rice will only grow in mucky bottom soil covered by two to four feet of water that flows sluggishly around one mile an hour, and in bay waters sheltered from

prevailing winds. It has to survive caterpillars, starlings and blackbirds and fungal diseases which attack the seed pods and attract insects that spread the blight.

According to the Indians, wild rice must have sufficient rainfall in the growing season to produce healthy seed. And survives all these changes of fortune, early winds can “harvest” the rice bed







*Traditional methods call for roasting the dried grain over an open fire, far left, while Chief Ralph Loucks displays a handful of rice he and his mother picked in 1949. Full rice heads are seen held against a paddle.*

before man can.

In Central Canada, wild rice is harvested with Goldbergerian binder contraptions mounted on pontoons. But the traditional native method is more productive, though more-consuming.

Usually, it's a two-man operation with a paddler in the stern pushing through the heavy growth. The harvester, seated in the bow facing him, holds in each hand a three-foot long peeled beating stick. Flipping the grain over the gunwale with one stick, the harvester strikes it sharply with the other. The green, inch-long kernels fall.

In a good year, a two-man team can harvest 300 pounds of grain each day and may work over a rice bed as many as four times. The loads of green grain are then paddled to a temporary ricing encampment.

Un-dried thoroughly, sometimes for days, the grain is roasted in iron kettles over open fires, constantly stirred with a wooden paddle to prevent scorching. The heat loosens the hull from the seed. Then in a shallow pan, pail or depression in the ground — but traditionally in a hollowed pine block — a person in clean moccasins will "dance the grain." In early times, this was done to the accompaniment of chanting.

Winnowing out the chaff is a simple operation, tossing the grain into a moderate cross wind over a canvas ground cover. The rice will then last indefinitely if stored in a dry place.

Wild rice in the days of the Canadian fur trade was counted upon as a staple food for the voyageurs of the Western canoe brigades. It was purchased a ton at a time by trading companies in the Lake of the Woods region to sustain crews who traded goods to northwest posts before freeze-up.

Alexander Henry wrote in 1775: "The voyages could not have been prosecuted to their completion without country rice."

About the same time, in a journal by David Thompson, it was recorded that "Mr. Sayer and his men passed the whole winter on wild rice and sugar, which kept them alive, but in poor flesh." The writer was more enthusiastic about wildfowl that fed on the rice, for "they became fat and well tasted."

If wild ducks taste better for having feasted on wild rice, gourmets the continent over agree that used as dressing for roasting game birds, domestic fowl and venison, the grain imparts a nutty, ambrosial flavor.

Equally important to the now defunct

wild rice industry at Rice Lake was Stanley Taylor, a merchant buyer of the grain at Keene village, eight miles east of Hiawatha Indian Reserve.

Mr. Taylor, now 79, dealt in that commodity from 1919 until he sold his store in 1949. Even this fall, 20 years after his retirement, he was receiving an average of three phone calls a day from traders and sportsmen who want wild rice.

Mr. Taylor bought rice by the peck, half bushel and bushel, preferably at the end of each day's harvesting. He accumulated 3,500 pounds each fall, up to 9,000 pounds in a bumper year.

Throughout the winter, he advertised wild rice seed in sportsmen's magazines for spring planting. He shipped the damp sprouting seed in wet moss-lined wooden boxes across North America. And so famous did Taylor's Seed Rice become that export orders followed automatically.

Five outlets in England bought rice for resale. Sprouted rice did not mature naturally although a dry seed test plot sown at Kew Gardens returned a 45 per cent germination. The German government imported a quantity of damp rice in 1924 and grew it successfully in the Rhine. It was also grown in Austria.



Switzerland and Brazil.

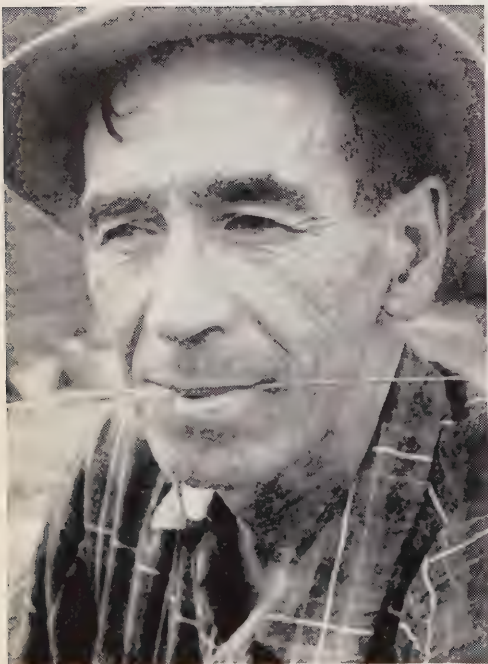
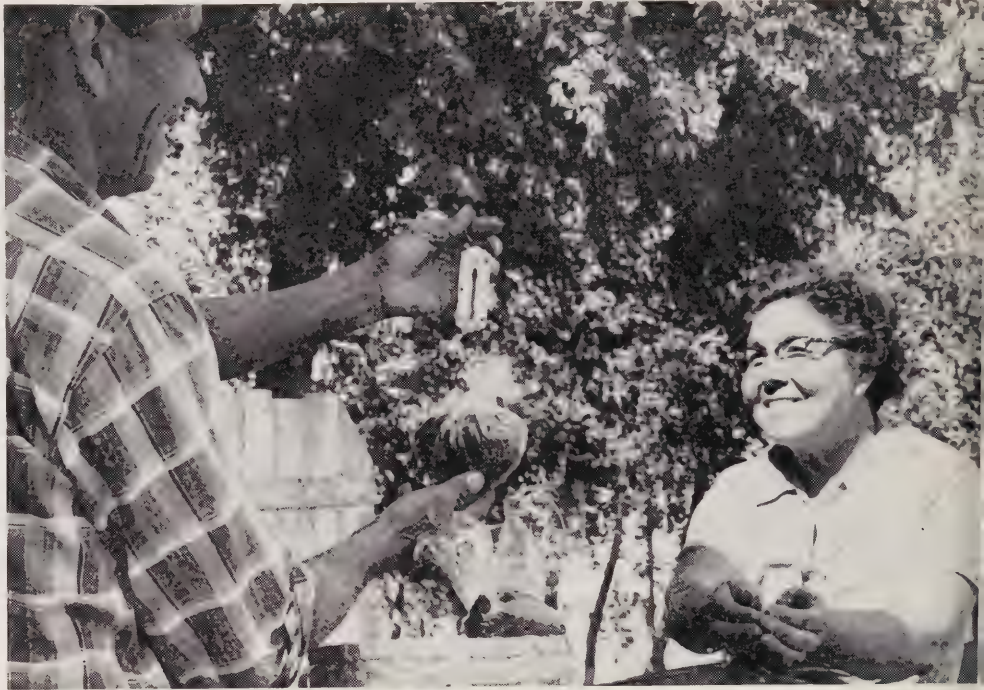
The Soviet government ordered damp seed against Taylor's warning that the proposed planting area was too cold. He was right.

Wild rice is not an exclusively Indian commodity, but the harvesting is controlled by the fish and game departments of the provincial governments. A non-Indian may harvest rice for his own use in areas where Indians are not interested in gathering it. In controlled areas, permits are issued exclusively to Indians.

No federal law prohibits the export of wild rice and 90 per cent of the Canadian crop goes to gourmet markets in the United States.

But around Rice Lake, those bumper harvests are likely to remain a dream. Unless the chief of the Hiawatha band risks that precious woodshed hoard. And unless luck is well and truly on his side. □

*Austin McCue, bottom left, from the Curve Lake Reservation knows where isolated patches of wild rice may still be found. He and his wife are seen packaging the grain in one-pound bags. Ceremonial songs were once chanted while "dancing the grain" to separate the hulls from seed.*





# chips off the old block

Highly automated and all-electric, this northern  
lumber operation is essentially a family affair

Heavy trucks whining low-gearred from the bush with their century-old loads of spruce and pine, the rumble of an almost barbaric debarker and the agonized screech of planing machinery . . . all this is music to the ears of Emil and Alf Penner.







Photos: Ron Brown

Get the Penner brothers talking about the company they've twice built up from scratch and they seem not to heed the afternoon swelter and the mosquitoes that come big and bite hard in this lonely land of forest and lakes northwest of Dryden.

Despite its 100 employees and plans to employ half that number again, Colenso Lumber is essentially a family affair. And the Penners are proud of it, and intend to keep it that way. Their neat white-painted homes sit side-by-side, a discreet distance from the sawmill but near enough to run across any time of the day or night.

Next door to Emil lives his youngest son, Barry, who looks after the company's trucking operation. Next door to Barry lives Alf. Emil has two other sons in the business. Martin, at the age of 29, is general foreman while 32-year-old Alan manages logging operations across 170 square miles of bush around Ear Falls.

Alf Penner has two sons, 36-year-old Gordon, who is mill manager, and yard foreman Jim Penner, aged 34. Ten months a year, the Penners live and breathe sawdust. They smile with satisfaction as their 10-acre pond glazes over at the first breath of winter and the logs pile high on the ice. Although logging continues, mill operations grind to a standstill from mid-December until mid-February as the temperature winds down well below zero. But that's when the best plans are laid.

Plans like installing a new debarker — the present machine strips clean three 16-foot logs a minute, but the rest of the ultra-modern all-electric mill can handle seven. Plans like working two shifts a day instead of one and boosting production from 10 million to 20 million board feet a year.

Ambitious ideas. Yet the beginnings were humble enough. Emil and Alf learned the

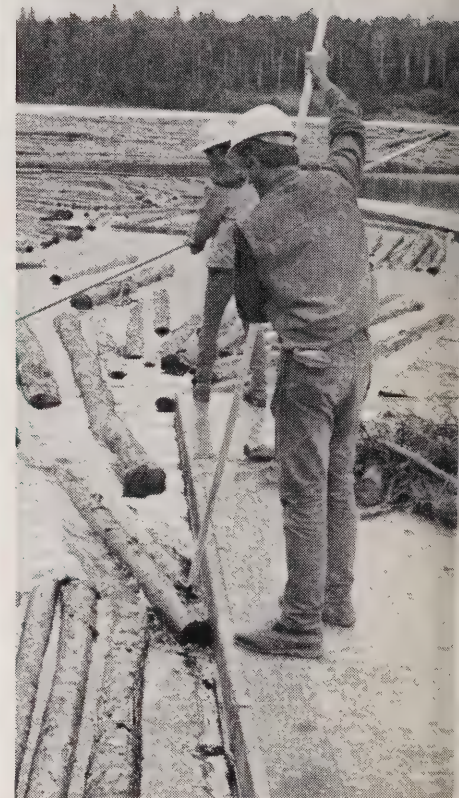


Logs are unloaded from trucks and dumped in a holding pond from which they are later guided into the mill. Seen in the lumber yard: Emil Penner.

business from their father, who made wooden doors and sold lumber in Steinbach, Manitoba. But the vast forests of northwestern Ontario promised richer harvests and in 1945 the Penner brothers crossed the provincial boundary to establish their own company.

They hired about 50 men and embarked on a modest course, producing pulpwood and about two to three million board feet of lumber a year. Business progressed steadily until September, 1967. Then disaster struck.

Fire, an ever-present hazard in lumbering operations, wiped out the entire saw mill one evening. It burned for five hours. Dawn brought nothing but smoking embers, charred machinery and a lot of people looking for jobs. About \$200,000 had gone up in smoke.

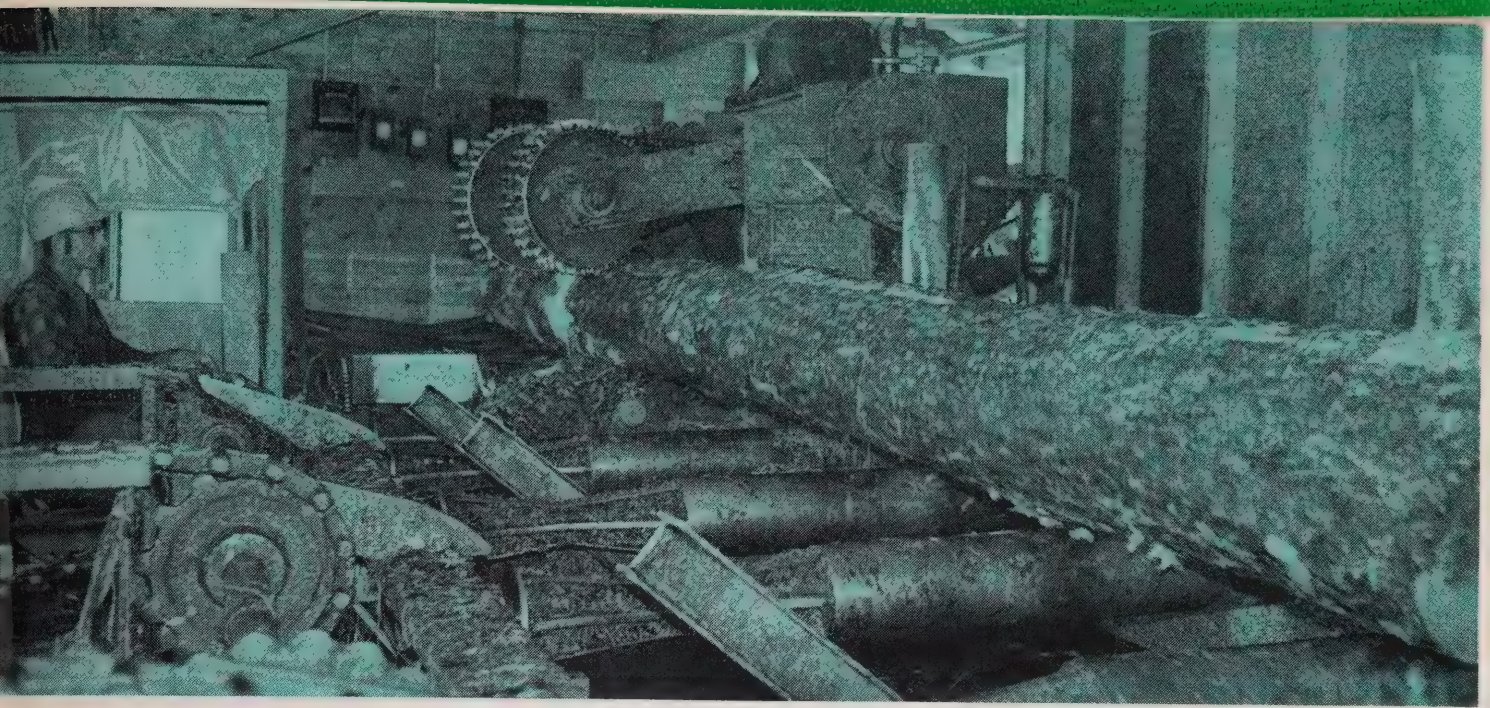


"I was away at the time," says Emil. "Apparently, sparks from the old incinerator were whipped up by a 50 mile an hour wind from the south and the sawmill caught fire. We had our own fire-fighting equipment, the Lands and Forests people brought in pumps and the entire district turned out to form a bucket chain.

"Several times the planing mill caught fire and the office started burning. We got them out. There wasn't a hope of saving the sawmill, though."

It took the Penners nearly a year to recover from this setback and start to rebuild. But rebuild they did — with the help of a \$105,000 forgivable loan from the Ontario Development Corporation — and the result is a streamlined automated mill that is second to none in the area.





*Debarker can strip three 16-foot logs a minute, but plans call for a faster machine.*

machinery is powered by electric motors, ranging in size from ¼ horsepower to several 150 horsepower units. Forced blower units supply heat for the mill, making use of lower off-peak rates (heat from the machinery keeps the temperature at a comfortable level during working hours). All controls are operated either electrically or pneumatically to avoid oil dripping on the floor and mixing with the sawdust that piles up at an alarming speed. In fact, the floors are continually swept to keep sawdust and wood chips to a minimum.

Automated controls permit the entire operation to be handled by four skilled workers, compared with 12 in the old sawmill, while output has more than doubled. Nevertheless, the Penners expect the full range of their operation will require 140 employees by the time they're at full production.

Among the new equipment is a machine which processes logs of varying diameter, turning them into lumber at a single pass. Logs are moved by conveyor belt out of the sawmill in a steady stream to be trucked to Dryden for the manufacture of pulp and paper. As yet, there's no real use for either the sawdust or bark although Emil Penner expects these waste products to be incorporated into some form of particle board within the next two or three years.

While there are a number of lumber mills in the area — Ontario ranks third among the Canadian provinces as far as lumber production is concerned — there are few secrets and competition is not far from the throat. "We don't call it competition," says Emil. "When markets get rough

we're all in the same boat."

Last spring, the construction industry was booming and sawmills couldn't fill their orders. Then came the squeeze on the US economy as federal authorities tried to halt inflation. American builders stopped buying in British Columbia, which began flooding Ontario and the rest of Canada with its enormous output of timber. So the going at present is rough.

"All the same, we're selling quite well locally," adds Emil, who is confident Colenso's reputation for high-grade lumber will carry it through. All wood leaving his yard receives the Ontario Lumber Manufacturers' Association stamp required for government-financed housing. Colenso does the grading with routine checks every two weeks by association inspectors. The lumber also comes under the scrutiny of the Canadian Standards Association.

"If you don't have quality, you're soon out of business," says Emil. "Actually, grade-stamping was a godsend to us. Before that, we might ship a car-load of lumber to Chicago and then be told by the buyer that unless we dropped the price \$25 a thousand feet we could take it all back."

With the introduction of uniform standards, those days are over. Thankfully. But the Penner name still means more than a grade stamp. It's so well known that the company doesn't bother with a sales force.

"I'm the firm's only contact with the outside world," says Emil, who at 60 is marketing manager and sales force all rolled into one. But that's how it is in a family business. □



Britain's newest coal-burning power station opened recently at West Burton, Nottinghamshire, under a financial cloud. Cracks had been detected in all four of the 2,000,000-kilowatt plant's boilers. Examination of boilers in seven more power stations also revealed hairline cracks radiating from welds.

Each defective boiler will be out of service for six months while it is brought up to standard.

Closer to home, supply problems caused seven of the eight turbine-generators at Ontario Hydro's Lakeview power station, just west of Toronto, to be delivered late. The average delay was nine months. The chain reaction of revised schedules and replacement power cost Hydro an estimated \$500,000 a month.

Instances like these have increasingly plagued utilities and sliced into manufacturers' profits as burgeoning power demands have called for still larger and more complex equipment. They've reached such critical proportions, in fact, that industry and the utilities are sitting down together in an attempt to solve the problem.

One of several solutions now being applied with increasing vigor is quality assurance.

# quest for

by Les Dobson

Undoubtedly, quality assurance is a term which will enter into business discussions with increasing frequency as orders are placed for the highly sophisticated machinery of the 70s and 80s. Mechanical or electronic failure can have drastic consequences, as for instance in space travel or heart surgery. At the very least, it spells inconvenience and expense.

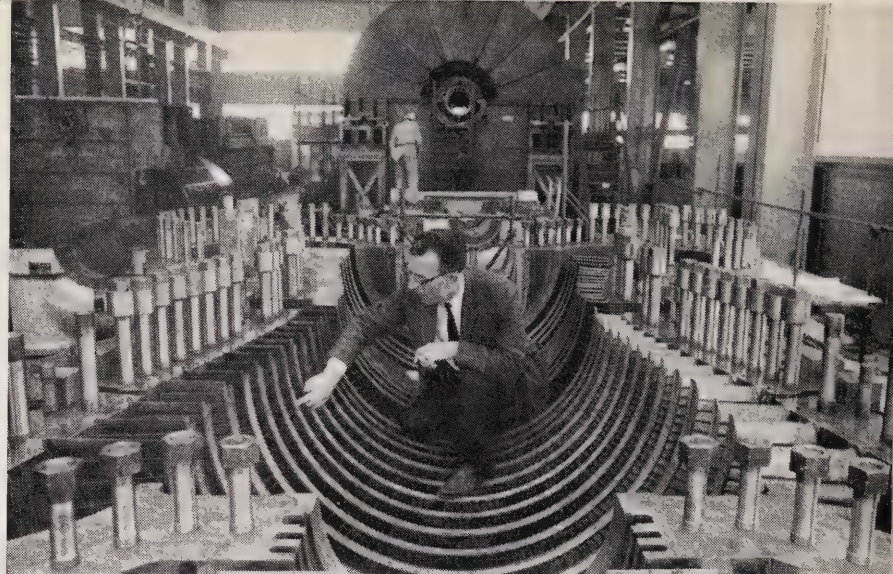
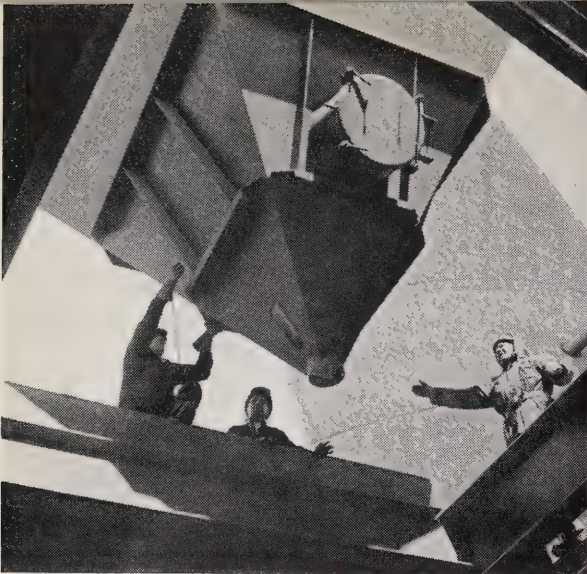
Basically, quality assurance refers to management installed procedures to ensure that specifications and tolerances imposed by the buyer are met. For the potential customer, this goes hand-in-hand with price and delivery. Anyone can buy a high degree of reliability, provided he's got the time to spare and the money to spend.





# Quality





*Practically every time equipment arrives at a generating station, both utility and manufacturer are breaking new ground in terms of complexity and size. Giant hopper was installed at Ontario Hydro's Lakeview power station. Inspector is examining turbines at the manufacturer's plant.*

Representatives of Britain's Central Electricity Generating Board sat down with the boilermaking industry as early as 1965 in an attempt to get a quality assurance program under way. The West Burton debacle only proves their worst fears. Ontario Hydro, which last year alone committed itself to an expenditure of nearly \$400 million — the money goes on everything from uranium fuel to pencils — started studying quality assurance in 1966.

"Some manufacturers were not really living up to their responsibilities," says quality assurance engineer John Platt. "They'd accept contracts and schedules and consistently fail to meet delivery dates. This was partly the result of overzealous salesmen and also a belief that the only difference in the larger units we were ordering was that of size. But you can't extrapolate design like that for major complex components of generating plants.

"It took one manufacturer 11 months to make a final decision to scrap a turbine casting that we told him was completely unacceptable in the first place. To avoid situations like this, we've been doing almost total inspection in the plants — in fact we still are — and with the increase in orders our costs are soaring."

No utility in Canada and perhaps only two or three in the United States can match the tremendous expansion program now embarked upon by Ontario Hydro to the tune of more than two billion dollars. To help keep track of what's happening in the foundries and machine shops, full time inspection offices are maintained by Hydro in Toronto, Montreal, Hamilton, Peterborough and Guelph. Agents in Tokyo look after business placed in the

Far East; Merz-McLellan, an international firm of consulting engineers based in Newcastle, England, keeps a close eye on contracts let in the United Kingdom and Europe.

At present, inspectors help to assess a company's capability of handling a job, observe its progress when a contract is let and check the quality of workmanship. Close scrutiny ensures that the dimensions of a component meet the engineering specifications while the hunt for minute flaws embraces a number of sophisticated techniques including ultrasonic and radiographic testing.

However, with the establishment of the new quality program, manufacturers will find the onus of inspection gradually falling on them. The Hydro inspector's job will become more that of auditor, verifying the manufacturer's inspection procedures and calling on proven companies at less frequent intervals as confidence is gained.

First step in the program was the drafting of quality standards to be met by bidders. These become part of the engineering specifications and include guidelines on workmanship, inspection equipment, manufacturing procedures and other functions.

"Initially, no company will be able to meet it 100 per cent," says Mr. Platt, "but the ones which come closest are likely to receive the most consideration."

The quality standards deliberately follow those applied by both the Canadian and U.S. governments. This avoids confusion among the manufacturers.

Secondly, a company's capability of handling a particular job is being subjected to extremely close scrutiny. It may even involve placing a pilot order before making

a commitment for the entire contract. This happened earlier this year when four companies were asked to make a sample batch of nuclear boiler tubing. The eventual order may be worth around \$18 million.

Only manufacturers selected on the basis of present capability and past performance will be asked to bid on a particular contract. Others interested in the order will be told why they were by-passed in the hope they will upgrade themselves and become eligible for future bids.

"It may cost up to \$200,000 to even prepare a bid for a \$25 million contract and it's hardly fair to ask a manufacturer to go to this expense when he's not real in the running," says Mr. Platt. "Of course if he insists on bidding that's entirely his affair."

It is hoped to improve evaluation by keeping a punched card record of each manufacturer. Data will include not only the way in which the contract was handled, the quality of the product and delivery dates, but also how the equipment functioned once installed. This will involve feedback from dozens of electrical and mechanical maintenance groups in major Hydro installations across the province.

Thirdly, pre-tender meetings are now being held with company representatives particularly their engineers. These are thought to be extremely useful as they permit at least some of the difficulties involving complex specifications to be resolved before price and delivery are mentioned. Discussions hinge on the manufacturers' production facilities, how they select and control their materials and the subsidiary suppliers they will utilize.



We expected a great deal of resistance, but have encountered almost a sigh of relief because companies say these meetings give them a better foundation on which to base their bid," says Mr. Platt. "In addition, each company has the satisfaction of knowing the competition was told exactly the same thing."

In the new climate of co-operation, many Canadian manufacturers were well ahead with their own quality programs before the Hydro specifications were introduced. For instance, a newly completed manufacturing development plant built by the Atomic Power Division of Canadian Westinghouse in Hamilton will determine and set the parameters for nuclear engineering both at Hamilton and the company's nuclear fuel plant at Port Hope.

The development of welding techniques is high on the list of priorities and involves a major switch to automated welding, which ensures better control. As a precaution against stray radiation, work on fuel bundles will be done in special isolation areas.

While he does not envisage any major change in existing reactors, division manager John M. Toye feels that small but important design changes will keep manufacturers busy retooling and changing production techniques for at least a decade.

Here, we're not manufacturing standardized products such as transformers or circuit breakers," he says. "This means the design is subject to changes, and it doesn't need much of a change to bring about a major switch in production."

Mr. Toye warns that the price of being right is higher in the nuclear industry than in the manufacture of conventional thermal-electric equipment. But so is the price of being wrong. He cites the analogy of a faulty coal-fired boiler being taken out of service. It might take a week to cool down sufficiently for repairs to begin. On the other hand, radioactivity frequently makes repairs to nuclear equipment a lengthy process. Quite simple problems may take several months to correct because of the limited time that workers can be exposed to radiation.

Another executive, Mike Rodinos, chief engineer of the Dominion Bridge Company in Montreal, says that the increased production costs resulting from a quality assurance program will be passed on to the customer.

At the same time, Mr. Rodinos waxes enthusiastic about quality assurance. "It is essential that something like this come out. We're very, very happy to see Ontario Hydro introduce this program."

Dominion Bridge is a major supplier of structural steel, boilers, cranes and other mechanical equipment. It is deeply involved in a whole range of nuclear products and even before the introduction of Hydro's quality program was upgrading its standards to meet the tough nuclear code of the American Society of Mechanical Engineers.

To help the 90 or so electrical and mechanical inspectors in Hydro's Supply Division make a fair evaluation of potential suppliers, a standard check list is being drawn up. They will be also asked to report on company developments which may affect production, for example changes in machinery or company practices.

As the company proceeds satisfactorily with the job, the inspector will switch from almost continuous supervision to an occasional visit. The responsibility for quality control will have been largely handed over.

Co-operation between utilities may offer a powerful lever. In England, for instance, Ontario Hydro, the CEGB and Merz-McLellan account for the major part of the turbine business. There is every indication that these three will be presenting

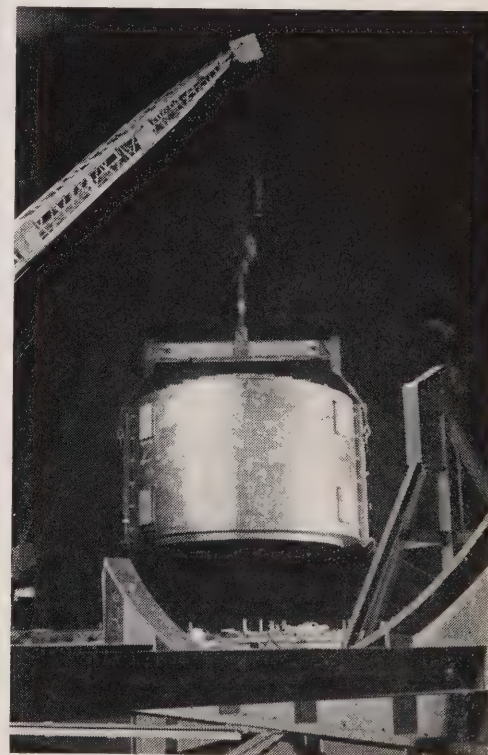
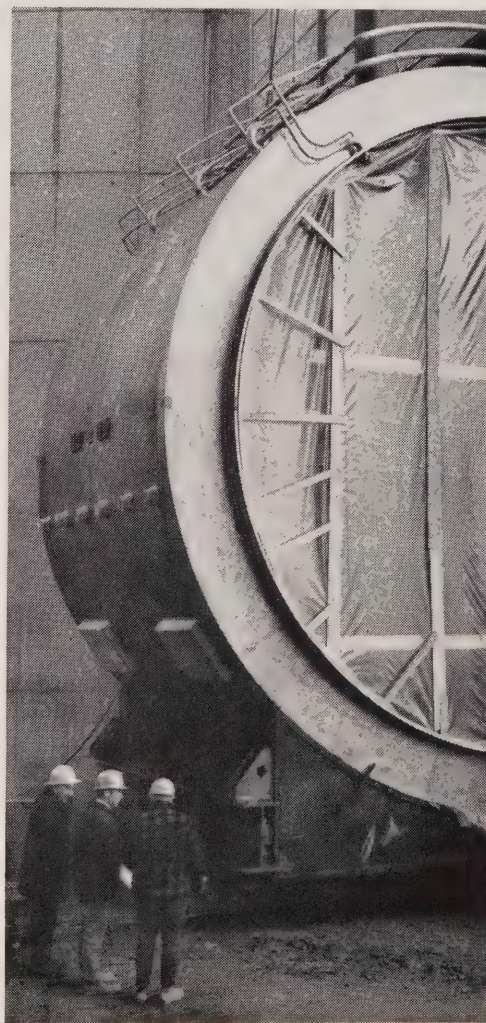
the manufacturers with similar standards of quality.

At the same time, the utilities have a responsibility for industry's welfare. As the only utility in Canada deeply involved in thermal-electric generation, Ontario Hydro has few sizable competitors when it comes to ordering the turbines, boilers, condensers and assorted paraphernalia of modern steam engineering.

Both British Columbia and Quebec have still a great deal of hydro-electric potential to tap. Hydro-Quebec has yet to make a commitment to full-scale nuclear stations and is unlikely to do so while there is a plentiful supply of water power from the Manicouagan and Churchill Falls developments.

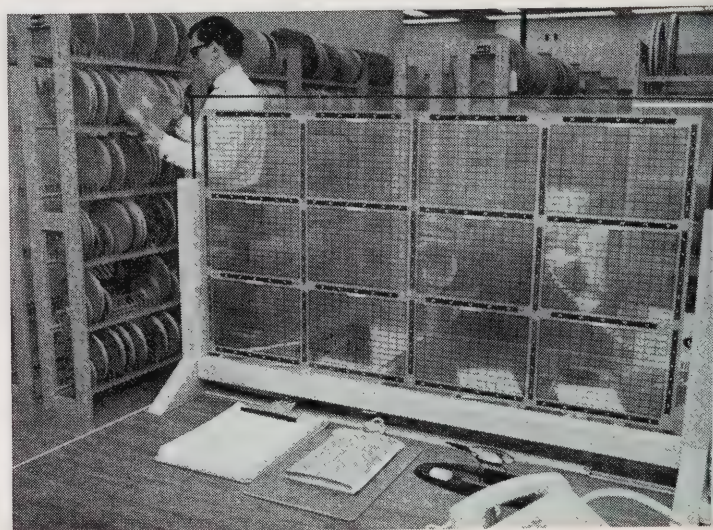
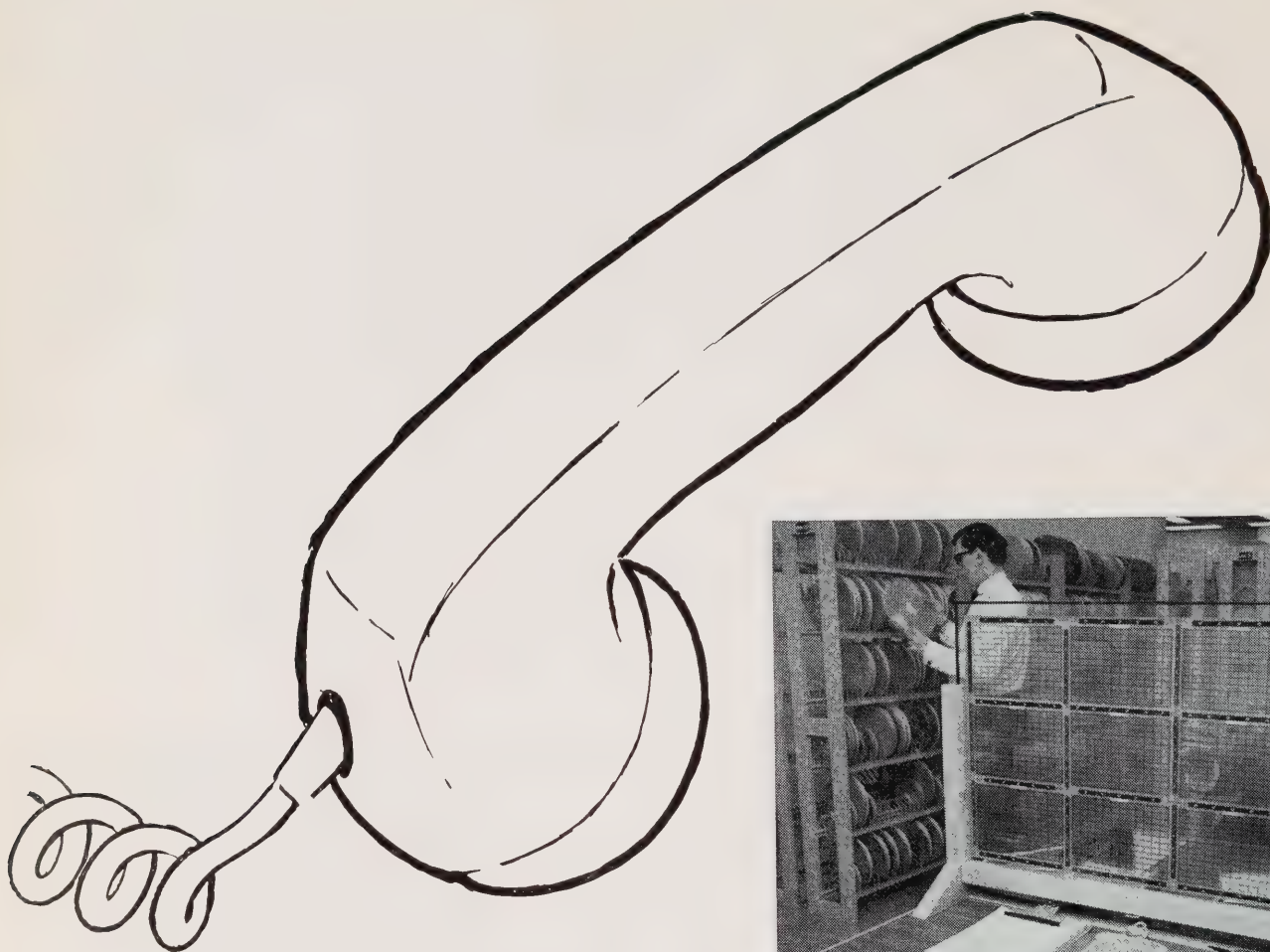
So the task of supporting Canada's thermal components industry falls on Ontario Hydro, which buys Canadian wherever possible.

"If we can hold the business together for another 10 years, maybe we'll have other provinces in the game," says Mr. Platt. "Certainly, if we're going to expect firms to maintain a quality system, up-to-date equipment and a high calibre of engineering, we've got to give them business." □



Careful handling is required when something as large as this calandria is delivered at Pickering nuclear power station.





A literature teacher in an Ottawa high school was having difficulties. The students just weren't grasping the intricacies of Shakespeare's "Macbeth". So she walked over to a telephone on the wall, lifted the receiver and requested a TV program on the subject. Five minutes later, the students were watching a half-hour film on "Macbeth, The Politics of Power."

In another Ottawa school, the common room was filled at 8.15 a.m. with history and literature teachers previewing a film dealing with the frontier adventures of James Fenimore Cooper. If they liked the film, each would be able to show it at a time fitting his or her individual teaching schedule.

The technology which allows these teachers to control their TV programming is called an Information Retrieval TV system (IRTV). And the particular system at work in four Ottawa schools is an experiment in the use of classroom television to provide teachers and students with "on-demand" audio-visual aids.

The purpose of the experiment is to assess the feasibility of combining telephone and television to get audio-visuals out of a central library and into the classroom whenever the teacher wants them.

In Ottawa, the teachers select a film from a catalogue listing about 2,000 films and video tapes, and phone through their

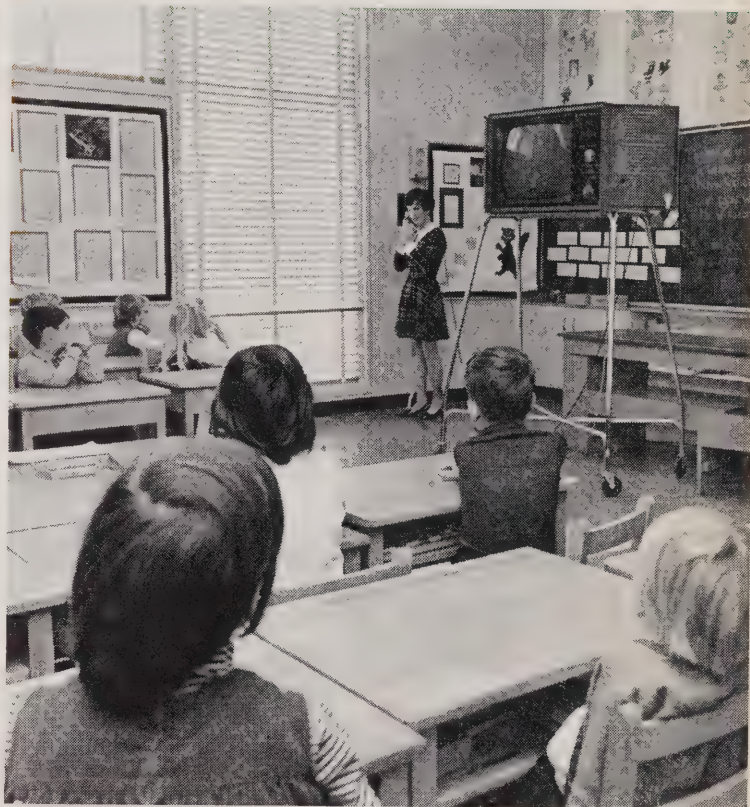
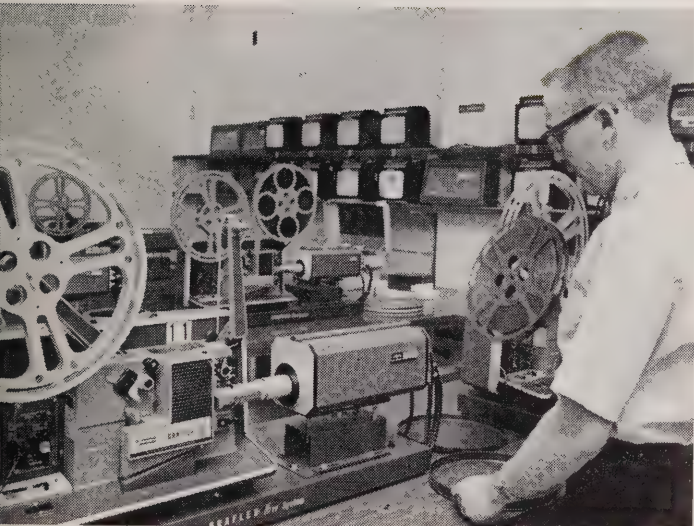
request to a librarian located in the Britannia telephone office in Ottawa's west end. The librarian confirms the availability of the film, the time slot requested and assigns a viewing channel one of 12 available. Then a technician slips the film or tape into position for transmission by telecine projector or tape recorder. The entire procedure may take as little as two minutes.

At the heart of the system is a coaxial cable network that allows the use of more channels than is possible by conventional air-wave broadcasting techniques.



# Instant Macbeth

Harriet Law



*A phone call from the teacher, and within minutes an educational film has been taken from the library shelves and is being transmitted to the classroom.*

Two-year experiment is being sponsored jointly by Bell Canada, the Ottawa Catholic School Board and Ottawa Collegiate Institute and the Ontario Institute of Studies and Education, which is conducting the experiment from a pedagogical as well as a technological viewpoint. Northern Electric designed the system.

Significantly, no new or untried equipment will be introduced in the first part of the experiment because one of the objectives is to discover how effective is existing equipment. Northern Electric will study the results to determine whether modifications are necessary.

At present, the broadcasting equipment consists of a mixture of video tape recorders and cine-projectors working into television cameras. The final proportion of VTRs to telecine projectors will be known when more operating experience is gained.

The distribution network feeds into a coaxial cable system serving more than 100 teaching areas in the four participating schools. The teacher simply lifts the telephone receiver and arranges with the librarian for a program at a specific time. A few seconds before transmission begins, a light flashes on the phone to warn the teacher.

Consideration was given to incorporating color receivers in the system, but the additional cost was thought unjustified at this time.

Once educational philosophy regarding the use and content of IRTV is ironed out, the system should revolutionize classroom teaching. For it puts teachers in the driver's seat: it's now possible for them to preview any film and decide whether or not they want to use it. And they can schedule the films for any time of the day, any day of the week, which is where the system scores over normal educational television. □





*With the Detroit skyline in the background, R. J. Boyer, Ontario Hydro first vice-chairman, J. Clark Keith, former Windsor Utilities Commission general manager, and Glenn Fisher, present general manager, talk at the AMEU Western Accounting Conference.*



*Heading up the Grand Valley Municipal Electric Association for the coming year are: Top row, J. M. Lind, St. Marys; C. Lipphardt, Harriston; J. McMichael, Listowel; George Gathercole, honorary president and W. A. Smith, Waterloo. Seated, D. R. Larkworthy, Stratford; G. D. Sills, past president, Seaforth; Archie McGugan, president, Palmerston; Mayle Fisher, 1st vice-president, Galt, and D. M. Seath, secretary-treasurer, Stratford.*

## a mixed bag

**Regional government, labor relations and cable TV provided a mixed bag for OMEA and AMEU delegates meeting across the province**

### **Pace of regionalization slows in the west**

Ontario Hydro Vice-Chairman R. J. Boyer told a two-day conference of the AMEU's Western Ontario Accounting and Office Administrative Section that the switch to regional government in that part of the province was not as imminent as might have been earlier supposed.

"There are a number of regions where the pace of development for one reason or another has accelerated. The problems and the pressures which have resulted have made more urgent the question of increased total responsibility. For this reason, the fullest attention is being given by the Department of Municipal Affairs to these other parts of the province," said Mr. Boyer.

No new government reviews were being carried out although there had been requests for them in certain areas.

Mr. Boyer, MPP for Muskoka, said a high priority had been placed on a system of representation giving residents a reasonably equal voice. To further this objective, regions would be set up on a one or two-tier basis, depending on local circumstances, and new boundaries should be usable by other institutions.

"Municipal councils will be strengthened by removing the power from many special-purpose bodies and turning them over to regional and local municipal councils," he added.

"This point, I know, is where your interest in regional government lies. In specific proposals for regional government made thus far, municipal Hydro utilities have been left out. In fact, Mr. McKeough, the minister responsible for implementing regional government policy, has stated that the government is not yet prepared to make any recommendations as to the form Hydro should take under regional government."

Mr. Boyer then outlined the situation in Muskoka where a review has been completed, and in the Lincoln-Welland area where the new form of government comes into effect in January. In both cases, he said, no substantive change was contemplated for Hydro — "at least for an interim period while the best arrangement for the region is being carried out."

He said that residents of the new regions and their elected representatives would be less reverent than utility people. While they might appreciate the highly technical nature of electrical service, they would assume it differed very little in principle from the provision of other services.

"Regional government in Ontario is a progressive response to the modern needs of the people of the province," Mr. Boyer added. "The question that will be answered in the coming months is: can the Hydro system be equally progressive in its response?"

In study sessions, delegates discussed everything from budgets to recovering underground distribution costs. Ample time was made in the program for the exchange of ideas. □

### **Let manager do the bargaining**

Not ones to interfere with a good thing, organizers of this year's Grand Valley convention stuck with the discussion technique. Introduced last year, the idea proved popular.

The meeting focussed on labor relations. Delegates split into three groups to consider the questions: Who should negotiate for utilities on management's side? Is more emphasis placed on the cost of employee benefits by management during negotiations? What is your wage philosophy?

In summary, group leaders all agreed that the utility manager should be the one who negotiated for management. A commissioner sat at the bargaining table, his word was the final one whereas the union bargaining committee could still go back to its executive or the members for ratification or refusal.

Speaking of employee benefits, John Lind, St. Marys, said the staff didn't know what benefits it got from the commission. At bargaining time, word about them only got as far as the union committee.

Bill Smith, Waterloo, said his group thought that a benefit information "fly" sent to employees' homes might be a good idea.

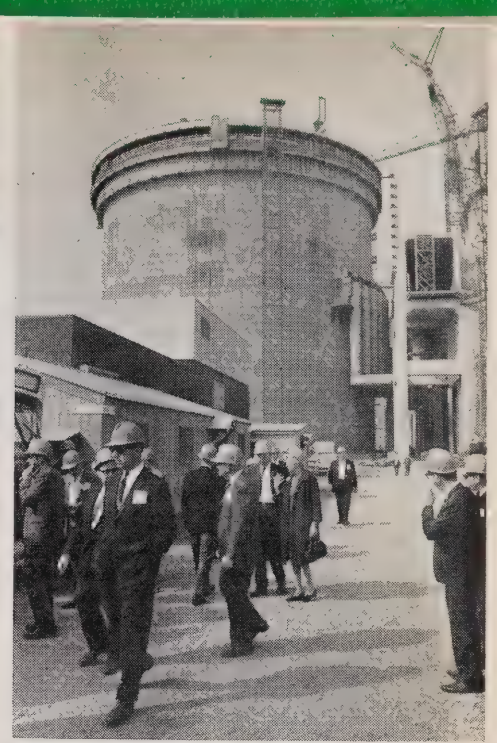
The consensus of Frank Rushton's group was that there were several nebulous benefit areas. For instance, should the provision for meter readers' uniforms be charged to safety, public relations or employee benefits?

Six commissioners were recognized for long service. OMEA president Henry Baldwin presented George Shephard, Elora, and Bruce Gabel, St. Jacobs, with cuff links for 25 years of service. Roger Weiler, Baden; Charles Brown, Clinton; Alfred Holst, St. Jacobs; and Ross Mar, St. Marys, received 15-year scrolls.





*Hours of discussion at District 6 contrast with a tour of Pickering nuclear station by District 1.*



## Wages and prices Go-round

Collective bargaining in 1969 has been a go-round in which wages and prices chased each other at an ever-increasing pace. E. G. Reynolds, manager of the Municipal Electrical Utilities Labor Relations Service, told delegates at the 10th Valley Municipal Electric Association annual convention at Galt.

Inflation continues to be the key element and union pressure for substantial wage increases," he said. "Pressure from wages has met with increasing resistance from employers which, in turn, has led to a high incidence of strikes and lockouts."

Municipal electrical utilities were no exception. In the first six months of the year, 60 per cent of 37 utilities negotiating had gone to the conciliation officer stage. A 13 per cent to the conciliation board. Three utilities experienced strikes before a settlement was reached.

In many ways, the technique of negotiating collective agreements is changing. Labor relations has grown from negotiating through employee associations to negotiating through national and international unions and their strong right arms of political activity," Mr. Reynolds said. "Co-ordination and co-operation between union locals in negotiating with utilities across the province are effective to a fine degree."

Reynolds commented on the three questions under discussion. They were: Should we negotiate for utilities on management's side? Is enough emphasis placed on the cost of employee benefits during negotiations? What is your philosophy of wages?

Answering the first, he said that "95 per cent of the time it should be the manager or member of his staff. Only in exceptional cases should an outside consultant or a commission member carry on negotiations and be the management spokesman."

On the second question, Mr. Reynolds said: "You will notice I have called this employee benefits, not fringe benefits because they have long since stopped being fringes."

He explained that the last AMEU survey covering 105 municipal utilities showed that benefits cost one utility 52 per cent of base productive earnings. These were only common benefits and didn't include such things as severance pay, inclement weather pay or clothing allowance.

"With benefit costs like this, much more emphasis must be given to them across the bargaining table. A complete wage package must include the cost of benefits," he said. "I suspect that the individual employee also is not aware of all the money his commission is spending on his behalf for benefits. We should remind employees of this more often."

Of wage philosophy, Mr. Reynolds said that a utility cannot exceed the pattern of wages and benefits paid in a community. "While it cannot pay more, it should not pay less.

"To be true to its purpose the utility must do everything it can to ensure that when it sells power at cost, the cost is based on purchases of material, facilities, services and labor at competitive costs combined with the greatest efficiency," he added. "Therefore, it should be the utility's policy not to be the leader in the community, but be among the leaders by maintaining wages and benefits within the top quartile of those paid by industry in the area." □

## Get into cable TV, he says

To Mayor Desmond Newman, of Whitby, cable TV means much more for a utility than collecting \$3 rental a month for each pole bearing coaxial cable.

"Cable television is really the birth of a massive communications system," he told delegates at the Oshawa meeting of District 1 OMEA. "And we should be getting into the business."

The key, he said, lay in the coaxial cable itself. One type of cable in use in the US had 32,400 voice circuits. Mr. Newman said the Canadian Radio-Television Commission, which regulates the electronic media, realized the potential of the cable TV system. In granting licences, it had stipulated that one channel be left vacant for possible local community use.

Mr. Newman, who spoke to the group on regional government (he's for it), suggested that use of the local channel idea might be one way of keeping people informed in an expanded municipal area. Other uses he foresaw for cable were in banking and meter reading.

"I realize the legal problems involved in the utilities getting into cable TV — even if it's only as a local carrier," he said. "But if we are to deal with the tremendous load growth in the future, we must seek new areas of revenue." (Last year, Kingston PUC applied to provide cable TV in the city, but the CRTC ruled that only the federal government and not a municipal government or its agent had the right to engage in the communications business.





*New District 1 executive includes: Top row, L. L. Coulter, Ottawa; Barclay Craig, Arnprior; John Deacon, Belleville; F. R. Cross, Nepean, and Earl Kennedy, Lindsay. Seated, A. J. Bowker, 2nd vice-president, Gloucester; W. A. Taylor, 1st vice-president, Peterborough; W. L. Andrews, president, Cobourg; H. F. Baldwin, honorary vice-president, and C. A. Baker, past president, Trenton.*



*OMEA President Henry Baldwin presented long-service awards to W. B. Marks, Bobcaygeon, with 25 years, and Albert Randall, Whitby; R. Henderson, Kemptonville; J. R. Philips, Brockville; and Fraser MacLeod, L'Orignal, all with 15 years.*

In most situations, the operator receives a licence, buys the cable and has Bell Canada string it. (Bell has agreements with electrical utilities for the use of poles where the telephone company has none.)

Mr. Newman said he did not wish to restrict Bell Canada. He only wished to make it possible for others to get into the cable field.

Of regional government, he said: "If communities in Eastern Ontario aren't re-organized into a regional set-up, they will stagnate."

It was necessary for Eastern municipalities to enlarge if they were to attract development of a sufficiently large scale. "So far, this kind of development has happened only in Southwestern Ontario."

He cited the 20,000-student University of Guelph project, the growth of industry in London and Sarnia and the billion-dollar development in Mississauga as examples.

The Whitby mayor gave other reasons for the needed change. Communities were just too small — the majority of municipal entities in Ontario deal with fewer than 1,000 people. Government spending at all levels had risen sharply in the last decade. But while federal government spending had shown the same percentage increase as the gross national product, municipal spending had grown at more than twice that rate. More effective, efficient municipal techniques had to be worked out.

Nepean Hydro presented two resolutions to the meeting, one of which was defeated.

The successful proposal asked that Ontario Hydro be requested to amend and expand its financial program to make interim and secondary financing available in

all-electric subdivisions. The preamble said that suppliers of other forms of energy had been advancing such funds to developers. As a result, large subdivisions which would have gone all-electric were being developed with heating and water tank heaters using other forms of energy.

F. R. Cross, of Nepean, said a subdivision there had been lost to competitors because of the lack of interim financing. The builder, who needed money for only six months, had always gone all-electric, but in this instance had to turn to competitors because he couldn't get the money from Hydro. "We're going to be in deep trouble if we don't do something," Mr. Cross added.

H. R. McDonald, also of Nepean, said that the Electrical Modernization plan provided for the older housing field. New housing was being neglected and this put a particular burden on communities like Nepean, a rapidly expanding suburb of Ottawa in which only about five per cent of the homes were old enough to qualify for the EM plan.

The defeated resolution asked that the OMEA investigate the feasibility of having easements negotiated on the basis that the home or land owner be responsible for maintaining trees and other vegetation at heights acceptable to the utility.

Introducing the resolution, M. J. Montague, of Nepean, said pruning and other related expenses amounted to a considerable sum. People were getting used to utilities doing the trimming, but if future easements were negotiated on the proposed basis word would get around and people just wouldn't expect the service. "They'd stop planting lombardy poplars that are growing through the conductors in a few years."

A. J. Bowker, of Gloucester, suggested the regulation would be difficult to enforce. Perhaps a better approach would be for utilities, through their public relations program, to "educate" landowners in acceptable planting. □

## Some enviable safety records

W. R. Pfaff, president of the Electrical Utilities Safety Association, told the East OMEA annual conference that district utilities had established some enviable safety records.

Among those mentioned, Eganville, Cardinal and Lanark have gone 10 years without an accident. Carleton Place has gone nine years and Cobourg and Morburg have worked safely for eight years.

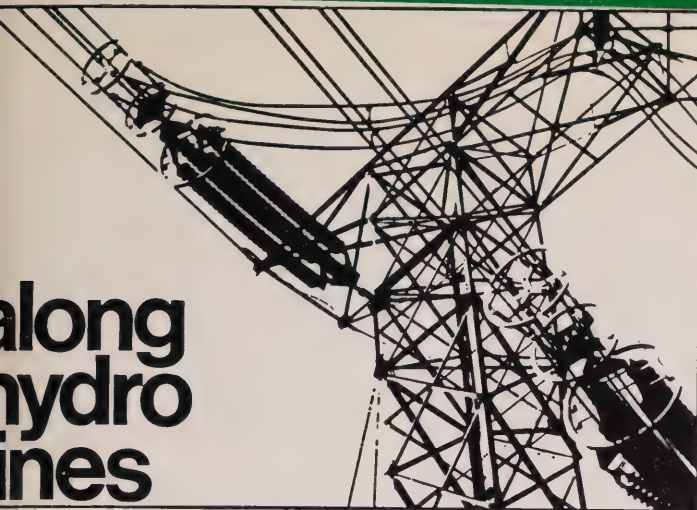
Mr. Pfaff said: "I would like to note that two utilities having the greatest number of man-hours in the accident-free list — Brockville (82,348) and Pembroke (36,573) — are managed by H. W. Little and J. L. Tron, both long time directors and past presidents of EUSA."

He said that in Ontario last year there were 295 compensable injuries reported to EUSA. It was an increase of 87 over the preceding year. "The cost of these injuries and this should be a major concern to all commissioners apart from the humanitarian aspect and the damage to the utility image, was \$213,960.

"However, this was a decrease of about \$30,000 from 1967," said Mr. Pfaff. □



# along hydro lines



## Money and brainpower

Municipal Affairs Minister Darcy McKeough dealt with one of Ontario's major issues last month — regional government and its possible effect on Hydro.

His talk was one of the highlights of Ontario Hydro's Finance Branch "Today-Tomorrow" conference at the Orangeville Training and Development Centre. About 150 representatives from all 47 local government offices, regions and projects attended the sessions focussed on the future.

Mr. McKeough said a case could be made for letting committees of local government administer municipal Hydro, but he stressed that he was not stating government policy. He indicated that studies now underway may indicate that perhaps Hydro grants-in-lieu-of-taxes should be increased.

Hydro Chairman George Gathercole, who also addressed the conference, said the municipal utilities were partners of Ontario Hydro and provided "valuable services." He said that if Hydro grants-in-lieu-of-taxes were increased, the additional cost would be reflected in Hydro rates.

He said Hydro was "an ardent supporter" of regional planning and was already playing a role in regional development, particularly in remote areas. Hydro service had been extended to supply 10 per cent of the province's demands, often to areas that other organizations would not serve.

Mr. Gathercole said Hydro was a unique enterprise and expressed the hope that the government would give Hydro's viewpoint full consideration.

Earlier, Mr. McKeough said that Hydro's role in the new regional government set-up would depend on studies now being worked out by Ontario Hydro, the Ontario Municipal Electric Association and the provincial government. He urged improved communications between Hydro and government to assist in planning and co-ordination. "We want to provide the best possible environment for the people of Ontario."

Regional government was only one of many topics at the conference. "The main aims were to stimulate thinking about Hydro's future, make people aware of what's coming and help them find out what their personal roles should be," said Norman Chapple, conference committee chairman.

Head-off speaker Harold Banks, assistant general manager — finance, suggested closer collaboration with the provincial government in long-range plans to locate thermal plants and in northern development plans so that overall cost could be maintained at a minimum level. □

## Anew horizon

Richard Rohmer, Q.C., is a practical man with a northern vision. As a personal Centennial project, he hired a firm of consultants to do an extensive study of Canada's mid-north. The result was his proposal for a coast-to-coast development corridor.

The concept envisions climate-controlled cities linked by air, rail and roads. Electric cars would be used for transit within cities. Hovercraft would transport people and supplies over muskeg and permafrost terrain.

Mr. Rohmer explained his mind-stretching idea at last month's Ontario Hydro Finance Branch "Today-Tomorrow" conference. Between 200 and 500 miles wide, the corridor would run from Newfoundland to Alberta and then split into three prongs, leading to Prince Rupert, the Yukon and the Northwest Territories. In Ontario, the corridor would sweep as far south as Sudbury and Sault Ste. Marie and through the Lakehead.

"We've got to open our minds to the fact that we are going to grow very rapidly," he said. The lawyer predicts Canada's population will be 40 million by the year 2000. But by 2069, he foresees an additional 100 million — many coming from the U.S. □

## Shh!



*Who pulled the plug?*

Delegates to the Canadian Electrical Manufacturers Association's annual meeting in Niagara Falls picked a novel way of closing off their conference. To mark the 25th anniversary of the association, they toured the dewatered and silent American Falls.

The thunder of water pouring over the 182-foot precipice was stilled in June by the US Corps of Engineers, who began a \$1.5 million project to determine the geological condition of the rock strata. □

## Taxless

The Supreme Court of Canada has ruled that transformers used by power producers are exempt from sales tax under the Excise Tax Act. The ruling came in a judgment on the appeal of Hydro-Quebec against paying sales tax on the purchase of transformers used on transmission lines. It reversed a decision of the Exchequer Court.

All major power companies, including Ontario Hydro, supported the Hydro-Quebec case in arguments before the Supreme Court. Under the Excise Tax Act, machinery classified as part of a manufacturing process is exempt. The federal revenue department argued that the production process ceased once the electricity left the generating station. However, the court took the opposite view. □



## Peek-a-boo

So far this year, over 350,000 people have visited Ontario Hydro stations and projects open to the public. That's about 50,000 more than in the same period last year.

Nine power stations, either operating or under construction, are open to visitors at various times. These are the Robert H. Saunders—St. Lawrence plant at Cornwall, the Nuclear Power Demonstration station at Rolphton, Des Joachims on the Ottawa River, Pickering nuclear station just east of Toronto, Lakeview west of Toronto, Sir Adam Beck No. 2 at Niagara Falls, Nanticoke near Port Dover, Lambton south of Sarnia and Douglas Point near Kincardine on Lake Huron.

Typical of the rise in visitors is at Douglas Point where the information centre, open from mid-May to mid-October, welcomed over 40,000 people. This is a 37 per cent increase over 1968. □

## A new look

Chalk River Nuclear Laboratories, reflecting the current government austerity program, is realigning and shifting emphasis in its programs, says L. R. Haywood, CRNL vice-president.

"Chalk River's first responsibility is still to take any necessary steps to ensure the growth of a viable nuclear power program," he said. "It is our capability beyond this responsibility which is undergoing some rethinking in the light of current economic conditions."

The overall long-term picture for nuclear power looks bright. Estimates are that by the year 2000 more than half the power in North America will come from nuclear energy. Ontario alone will have almost \$1.5 billion invested in nuclear plants by the late 1970s.

CRNL has formed a new fundamental chemistry group to support development of a promising new process for producing heavy water. To help hold the line on expenses, the Deep River townsite laboratory has been closed. Workers have been transferred to another laboratory.

In the Biology and Health division, costly studies of the effects of radiation on animals are being reduced, and experiments on simpler living systems (yeasts and bacteria) intensified. Experience has also shown that routine environmental surveillance as well as measurements of low-level radioactivity can be reduced. Other less predictable studies in the same area will continue.

Another measure will be to reduce the time the NPD power station is used for experiments. Revenue from the nuclear plant will be increased for CRNL by the sale of power to Ontario Hydro. □

## Stepping down



Richard Horkins



John McMechan

John McMechan, chairman of Toronto Hydro since 1964, retired. He has been succeeded on the commission by Richard Horkins, a Toronto alderman.

Mr. McMechan was appointed to the Toronto utility in 1964 as vice-chairman. During his 16-year tenure he has been instrumental in a number of advances for the utility. Among these are the conversion from 25 to 60-cycle power, the replacement of overhead conductors to an underground system, the illumination of Bloor Street with sodium vapor lamps, and the promotion of electric heating. His success in all-electric developments such as St. James Town has resulted in 50 per cent of all apartment units in Toronto now under construction or planned being heated electrically.

Recognized throughout the province for his work with the Ontario Municipal Electric Association, Mr. McMechan served as president of District 4 in 1960. He was elected president of the provincial body in 1964.

Mr. McMechan, now 75, was a member of Toronto city council for four years. He is president of Donlands Dairy, chairman of the board of Toronto East General Hospital, director of several companies and an executive member of the Toronto Metropolitan Industrial Commission.

Mr. Horkins, 43, represented Ward 9 on city council until his Hydro appointment on November 1. He was first elected to council in 1962, then lost a bid for Board of Control in 1964. He was re-elected alderman in 1966. Outside of municipal service, Mr. Horkins is associated with a firm of management consultants.

## Looking forward

Thunder Bay Hydro, which won't become a reality until January 1, already has a chairman. Jim Currie, of Port Arthur, will head the commission during its first year of operation. A 10-year PUC veteran, he was unanimously chosen by fellow commissioners L. A. Danis, W. O. Spicer, Waino Laakso and mayor-elect Saul Laskin.

At a later commission meeting, E. A. Vigars was appointed general manager of the new utility and Don Shipston was appointed secretary-treasurer.

Mr. Vigars has been manager-secretary of Port Arthur Hydro since 1954. He joined the utility in 1946. Mr. Shipston, at present treasurer and office manager of Fort William Hydro, has been with that utility since 1958. He assumed his present position in 1966.

## After you, Mr. Mayor

Tradition in Toronto, in the form of the mayor's Boxing Day blood donor clinic, is changing. It's being replaced this year by mayor's clinics in each of the six municipalities of Metropolitan Toronto. The Boxing Day affair was in the City of Toronto province and it usually garnered 2,000 units of blood. Aim of the six clinics is to double this figure. Dates of the clinics are: Etobicoke, York, December 29; City of Toronto, December 30; Scarborough and East York, January 2; North York, January 3.

## Pensioner dies

Harry Strickland, Ontario Hydro's oldest pensioner, has died at the age of 99. He was born in Peterborough and joined the commission as chief electrical inspector in 1913 — only seven years after Ontario Hydro was created by Act of Parliament.

Mr. Strickland formed Hydro's Electrical Inspection Department and drew up the first set of electrical standards. He retired in 1934. An accomplished violinist, he was one of the Toronto Symphony Orchestra's first members. He had lived in Bobcaygeon for many years.



## Printed front

ario Hydro and Hydro-Quebec combined resources this fall in campaign aimed at promoting electricity among major industries. took the form of a joint display at the Foresters International pment Exhibition at Ottawa. Part of the display featured the of electricity in the operations of Colenso Lumber, a North- tern Ontario firm (see Page 9).

ntario Hydro's participation in the show was part of an in- ive five-year program to introduce more electricity into the esses of heavy industry. The first segment of the campaign gain momentum next year when approaches will be made to stries manufacturing paper and allied products, wood prod- , furniture and electrical apparatus.

the booth was manned by personnel from Hydro-Quebec and ario Hydro. It was visited by several hundred delegates. □

## Change of plans

ew developments connected with the construction of the e Nuclear Power Development, near Kincardine, Atomic gy of Canada Limited and Ontario Hydro have announced the Bruce Generating Station will now be located at the ern end of the site.

iginally the plant was to be near the centre of the site closer e heavy water plant, but safety considerations established by Atomic Energy Control Board dictated a change.

ensive safety precautions are necessary near heavy water ts, which use hydrogen sulphide gas in their production ess. It was felt less costly to move the power station site and d the need for workers being subject to these regulations. □

## Safeguard

nic Energy of Canada Limited will add a \$20 million safeguard ure efficient production of desperately needed heavy water its 800-ton a year plant now under construction at the e Nuclear Power Development.

e safeguard will take the form of an oil or gas-fired plant to ly two million pounds of steam per hour to the heavy water llation. The steam-raising station, together with steam prod- by the nearby Douglas Point nuclear station, will ensure inuous production of heavy water.

ording to Dave Morgan, AECL's resident engineer at Bruce, heavy water operation is extremely delicate and after every down it will take a couple of weeks to get the plant to peak ency." An alternative source of steam is therefore extremely rtant. □

## Electric bronco

e foothills of the Rockies, where stetsons are worn and the crisp, local utilities are surprisingly pollution conscious.

lgary Power Limited recently acquired an electric automobile howing at fairs and exhibitions. A converted four-door ult, their "Electricar" is driven by an electric motor powered ) six-volt lead-cobalt-acid batteries.

e car has a range of 120 miles and a top speed of 60 miles an Recommended charging time for the batteries, which have a nteed life of 50,000 miles, is six to eight hours although they e restored to peak power in 46 minutes with special equip- . Plugging into a 240-volt receptacle does the charging natically.

gary Power made it clear at the auto's unveiling that they do ink the day of the electric car has yet arrived. Said executive resident M. M. Williams: "We are not going into the auto- e business, nor are we suggesting that people rush out and

buy electric cars. Our purchase is part of a continuing sales research and development program."

He added that the electric car could help to alleviate two major urban problems — noise and air pollution. □

## Togetherness

Two mergers of Ontario Hydro offices will take place in the next few months. One involves the merging of offices at Cannington and Fenelon Falls. The new headquarters will be at Fenelon Falls while a few Cannington area customers are being transferred to the Orillia area. Line crews will be retained at Cannington.

In addition, Hydro's Exeter area office is being combined with operations at Clinton and Strathroy. About 60 per cent of the Exeter customers will be transferred to Clinton; the remainder will be serviced by Strathroy.

Consolidation of these area offices is part of a province-wide reorganization that will achieve savings to power consumers of more than \$2 million a year. □

## Goodbye, muddy boots



*An inside look*

Scarborough PUC has introduced an electronic device that will save the utility thousands of dollars in reading water meters each year. It's also a boon to the housewife, since meter readers don't have to tramp through homes with muddy boots in bad weather.

Time studies by the PUC indicate a saving of 30 seconds a reading, or about one hour of a meter reader's day based on 120 readings. Multiply this by 15 (the number of meter readers on staff) and a conservative saving of \$17,500 a year results.

Meter reader George Richardson shows how he attaches the electronic device to an outside receptacle connected by cable to the water meter in the basement. Since the receptacle is mounted beside the hydro meter, both readings can be taken at the same time. PUC chairman M. W. Broley, PUC employee Cheryl O'Dell and commissioner R. E. Cavanagh see how it's done. □

## Glass from kilowatts

One of Ontario's first all-electric manufacturing plants is swinging into production in Newcastle. Custom Glass Limited's \$450,000 installation is turning out hermetically-sealed window units and aluminum-clad sliding doors and windows.

Sod-turning for the plant was in June and construction is now completed. It has a total floor area of 32,760 square feet on one storey. The building is prefabricated and was erected on a single concrete slab.

Manager William Sinclair says the building is heated with electric hot air fans and infrared units. Lighting is provided by mercury vapor and high-intensity fluorescent lamps. All the machinery is electrically powered. □



# municipal briefs

In Oshawa, seeing pink elephants is still reserved for the over-indulgent – but seeing pink power poles is not. Seventy-eight PUC poles on King and Simcoe streets have been painted pink. Said Lloyd Algar, assistant manager: "We thought it would brighten up the downtown area."

**Fred Leadbeater**, Newmarket Hydro's customer service supervisor, received a framed certificate, gold cuff links and tie clip set and a cheque from Chairman Fred S. Thompson. The gifts marked his outstanding promotional work, including the sale or renting to customers of more than 1,000 electric water heaters.

**Ontario Hydro's** Sudbury area staff have moved to new offices on Falconbridge Road. It is the largest area office built by Hydro and accommodates 75 people. Nearly 15,000 customers will be served from the all-electric building.

**Newmarket's** new municipal transformer station on Mulock Road has been named after Fred S. Thompson, chairman of the local commission since its inception in 1945.

**W. A. (Bill) Ferguson**, a member of Atikokan Hydro commission for 14 years, has died at the age of 61. He was chairman for most of his years with the utility. Mr. Ferguson was a past president of District 3, OMEA, and a vice-president of the provincial association. Born and educated in Port Arthur, he worked for the Little Long Lac Mine before World War II service with the Royal Canadian Engineers. He returned to the mine after the war and moved to Atikokan to work for Steep Rock Iron Mines in 1951. He was president of the local Legion branch for several terms, chairman of the Atikokan Hospital Board and a member of the Moose Lodge and Knights of Columbus.

**Ernie Fry** can best be described as spry. At 71 years of age, the retired Toronto Hydro employee completed the entire 32-mile route in a "Miles for Millions" parade in Toronto this year. Keeping up a steady three-mile-an-hour pace, he finished without a blister. He earned \$142 for charity.

**Hespeler Hydro** and Galt and Preston PUCs are getting even closer together – in fact, they almost moved into formal amalgamation at an inter-commission meeting last month. The three utilities voted to hire consultants to do a feasibility study on merging their water systems. Cost will be on a per capita basis. Some members of the Galt and Preston commissions urged an immediate and complete merger of the three utilities, but the majority were satisfied to move more slowly with the feasibility study as the first step.

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

A subordinate sentence relegated to the end of a recent story in the Wingham Advance-Times was as thought-provoking as it was succinct. Referring to the local Hydro commission, the particular sentence said: "There has never been a rate increase in the 50 years the commission has served the public here."

How characteristic this may be of other municipal Hydro systems in Ontario is open to discussion. The fact remains that the average local Hydro rate has remained so stable that it is often taken for granted in the constantly changing price structure of a community.

But the rest of the Wingham story is equally significant. The local commission was pointing out to its customers that whole-

sale rates have steadily increased over the past three years. While the commission had absorbed the increases so far, they were expecting a modest increase in consumer rates.

It makes good sense to warn customers that rate increases may be in the offing. And how much easier it is if you can state like Wingham, that it's the first increase in 50 years!

It would be dangerous to presume that the mayor or reeve will automatically inform council on all matters of mutual interest. states the latest section of the handbook "Public Relations with Hydro Utilities". The mayor's relationship to municipal council and Hydro commission is one of several areas covered in this chapter "Maintaining Good Relations with Civic Authorities". Others include borrowing problems, rate increases, and project involvement. As one of the more important bodies with which a PUC deals, municipal council may become the greatest critic or the staunchest supporter of a local utility.

The matter of getting along with council has attracted wide interest among local commissions in recent months. A paper on the subject was presented to a meeting of Northwestern Ontario utility officials in Atikokan in early September. Similar presentations were held at district meetings in Oshawa and Exeter last month. The handbook section has been distributed to each electrical utility office in Ontario.

Ever since the community relations program was organized among municipal electrical utilities more than two years ago, there has been a multiplicity of techniques used to "Tell the People". The latest to come to our attention is a 17-minute sound and color film from London PUC. The PUC is responsible for water, parks and recreation as well as Hydro and the film makes interesting viewing to Londoner and non-Londoner alike.

Called "London is Alive", the movie explains the operation of an elected commission and relates the various services provided with the effect they have on the community. Electricity, for example, powers the printing press which provides the city with its daily newspaper.

A motion picture is an ambitious project for a municipal utility to undertake. Of course, community relations programs can take many forms. The important thing is to get involved with programs designed for local needs.

## Inflation spirals rates

"The economic and social climate is pushing the cost of electricity upward," said Ontario Hydro Chairman George Gathercole in announcing an increase in wholesale rates to municipal utilities.

For local technical reasons, the increase will vary slightly from one municipality to another, Mr. Gathercole said, but will average about six per cent across Ontario. It is effective January 1, 1970.

The increase was forecast on several occasions during the year by Mr. Gathercole. He told the OMEA-AMEU annual meeting in Toronto last spring: "Rising interest rates, material and equipment costs and higher wages and salaries continue to press up our enterprise."

The chairman explained that the increase in wholesale rates will not automatically raise rates to municipal utility customers. Some utilities will be able to absorb all or a portion of the adjustment under their existing rate structures. Others will be obliged to pass it along in full.

Large industrial customers, who purchase power directly from Ontario Hydro, also have been notified of a rate increase averaging eight per cent. In October, 1968, rates were increased nine per cent to retail customers in rural areas and a further increase is likely.

Among the financial pressures peculiar to Hydro, Mr. Gathercole cited the switch to costly thermal-electric plants because there were few sites left for further hydro-electric generation.





## as don wright sees it

Anybody who is anybody, and others, have had their say about air and water pollution and it hasn't been easy for us to hold fire in these columns. But we have a problem. Feedback suggests that half of our readers want us to forget the more weighty dilemmas overhanging society and confine our observations to electrical developments with sexual overtones, if you can imagine. The other three are more explicit. They want sex – with or without the electricity.

Like it or not, though, every man has his principles and we intend to get in a few words on pollution even if it does mean a sharp drop in our Nielsen rating.

Nor do we intend to equivocate. Pollution is not the kind of subject toward which one adopts a neutral attitude. One likes it or one doesn't. And after the most careful appraisal of the moral, physical and metaphysical factors involved, we have decided to come out four-square or, at the very least three-square, against it.

Like most of the others in our camp, we haven't the slightest idea what should be done. But that doesn't really matter. Having taken our stance, we are now eligible to join sit-ins, wear buttons, view with alarm and point the finger of scorn at any scoundrel who dares to defile the chastity of our environment.

And, furthermore, we intend to observe protocol and keep our gun-barrels steadfastly fastened on the other fellow. The subjective approach can only lead to all sorts of unpleasantness.

Fancy the implications if, through some arthritic quirk, the finger of derision should accidentally wivel in the direction of its owner. Viewers with alarm could end up having to bury their household by-products in lead-lined backyard pits and leave their shiny new eight-cylinder hog makers to rot away in garages.

Thus our own private anti-pollution movement will be kept in perspective so that we can deliver our barbs while continuing to enjoy the cornucopia of good things being turned out by industry – black chimneys and all.

Dedicated as we are to our principles, there are some aspects of this pollution business which are not altogether without sexual connotations. Did you know, for example, that men's trousers have done more to distort the human race than any radiation emanating from nuclear plants?

One of the speakers at a recent University of

Minnesota symposium on nuclear power pointed out that as much as 50 per cent of the mutations occurring normally in contemporary man are thought to be due to increased temperatures in certain anatomical areas caused by the male practice of wearing trousers.

While this state of affairs has been suspected by scientists for more than a decade, the speaker observed: "I am unaware of any subsequent popular movement to prescribe kilts in place of the mutagenic habit of dress of the American male."

In other words, there are people who would bring an immediate halt to the entire nuclear power program in the United States because of its possible hazards, but they would not go so far as to suggest moving to the kilt even though the peril of pants has been more certainly established.

And, on the same program, another panelist used pregnant women to defend the purity of nuclear stations. He said that a woman living on the property line of a nuclear plant would have to remain pregnant for 400 years to accumulate the same radiation exposure as that from certain X-ray treatments which have been harmful to unborn infants.

He has a point there, perhaps, but we doubt its validity. Even 200 years is a long time to be pregnant.

■ Among the multitude of pollutants some claim will do us all in before next Groundhog Day is a villainous family headed by sulphur-dioxide, or SO<sub>2</sub> to its few friends. This is among the substances given off by burning coal and a group of US authorities has been conducting some interesting research work in an effort to find out more about the stuff.

In one experiment, groups of guinea pigs were exposed for a year to specific amounts of SO<sub>2</sub>. The survival rate of those receiving the heaviest dose – a massive five parts per million – was significantly higher than the other groups, including those receiving none! There was also a definite reduction in the incidence and severity of pulmonary disease in the group receiving the heaviest dose.

While these results are entirely conclusive, they could lead to the solution of a pretty important problem. Why couldn't Hydro trap the effluent from its tall chimneys and bottle it for home use and for public sniff-ins? Any product able to guarantee good health and longevity is sure to have a wide appeal.

And if it doesn't work that way on humans, the guinea pig market is worth going after.

Dr. Glenn Seaborg, chairman of the US Atomic Energy Commission, has hinted at another possible solution to the pollution problem associated with the production of electricity. In a recent speech he reached back into history to Lord Kitchener's African campaign during which two soldiers and a tandem bicycle were employed to generate the electricity to operate X-ray equipment for the medical corps.

A quick slide-rule calculation suggests that Hydro could meet its total peak load requirements with about 1.7 billion bicycles and as many pedalers. This doesn't allow for substitutes nor equipment maintenance and it seems likely that both would be required from time to time.

It's worth exploring further, perhaps, but at first glance the bicycle approach seems rather im-

practical. It would mean every man, woman and child in America, Africa, China and India devoting all their efforts to the production of electricity. And that's a lot of perspiration – a pollution problem in itself.

■ Pollution expert Harold Koenig, of the Ecological Science Corporation of Miami, says that atmospheric pollution could kill 90 per cent of mankind by the year 2000 and he has a repertoire of dark forebodings for every occasion.

Not only is Mr. Koenig a pollution expert, he's a great humanitarian. Determined to spare us the lingering torture of asphyxiation, he seems bent on scaring us all to death with his predictions.

■ At the same time, it would be folly to disregard all pollution warnings on the grounds they are alarmist. Some time ago, the City of Montreal health department warned that carbon monoxide from car exhausts was slowly damaging Montrealers' sight, hearing and brain cells.

Subsequent events seem to suggest that the department is at least one-third accurate. Whether or not sight and hearing have been seriously affected remains to be seen.

■ Closer to home, our only major personal sacrifice in the interest of pollution control was carried out some years ago when we made the switch from cigarettes to cigars. We did this on the theory that cigar smoke was the lesser of two evils where our own lungs were concerned and in the full knowledge that the move could only worsen the total environmental picture – a fact which has since been brought home to us on numerous occasions by confreres and loved-ones.

And now it appears as if the whole thing may have been in vain. According to two Kentucky doctors, people switching from cigarettes to cigars may lessen the risk from lung cancer, but develop "carbon monoxide intoxication" instead.

It's all very discouraging, but it does help to explain our rather unusual performance at the last office party. One cigar too many!

■ And there's more disturbing news from California. A scientist there claims that because of the general pesticide intake, human mothers' milk can no longer meet the required standards of purity set by the US Food and Drug Administration.

If true, this is intolerable. Packaging is important but quality comes first no matter how attractive the container.

■ Consider, finally, the sad case of Dr. Roger Egeberg, top US government health officer. He returned to Washington after dense smoke and smog prevented his plane from landing in Detroit where he was to address a clean air conference. □



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and the local utilities  
are interested in YOUR safety.





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## news december/69

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### the cover

Ten miles out in Georgian Bay, Red Rock lighthouse is exposed to the full fury of the lake. It's a lonely life looking after these beacons, and calls for a special breed of individual. See opposite for more about the Great Lakes lighthouses and their keepers.

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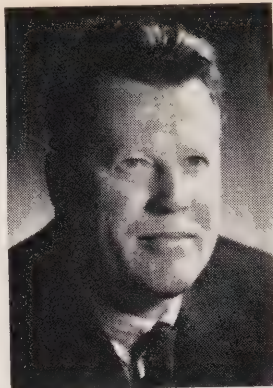
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On behalf of the Commission, best wishes for a Merry Christmas and good health and well being in the New Year.

*George E. Gathercole*

Chairman, Ontario Hydro

### Viewpoint

## public understanding

Pride and complacency are two entirely different commodities and while there is no room for the latter as Hydro enters a decade of unprecedented challenge, there are many reasons why the people who provide electricity to the farms, industries and municipalities of the province should walk with their heads held high.

Not the least of their achievements is reflected in the twinkling lights of Christmas. Nowhere throughout a territory larger in extent than many entire countries are there any restrictions on the use of power by householders as they light up for the holidays.

During the year, more than 1,200,000 kilowatts were added to Hydro's generating resources so that the annual peak load was approached with a somewhat greater reserve than in the last few years. And while the demand-supply situation remains tight, it is expected to continue to improve.

Keeping ahead of demand will require all-out capital construction at record levels no matter how unfavorable the economic climate. But other problems outside the realms of engineering and economics are likely to intensify in the years ahead. Not the least of these is public acceptance.

Speaking recently to a meterman's workshop in Toronto, J. F. Anderson, president of the Association of Municipal Electrical Utilities, noted that in the United States every move to locate a new generating station is literally being fought through the courts and that every tower line right-of-way gets snarled in legal red tape. He said that arguments over rate increases are actually delaying and sometimes cancelling construction projects.

"Some American electrical utilities are already advising their customers that reduced voltage service will be necessary and that brownouts may occur," he said. Of the situation here, Mr. Anderson said that if the trend to resist construction of new plant increases, our ability to supply power when needed may be jeopardized.

"I think we all realize," he added, "that a lot of opposition comes from the segments of our population who are deeply concerned about air pollution, thermal pollution and unsightly power lines — and there is no doubt that all thinking people agree that these are serious problems. However, it must also be realized that some form of compromise must be reached if the electrical utilities are to meet the demands put upon them. It should not be forgotten that the electrical industry is striving hard to reduce these problems."

Public acceptance is not too much to expect if people have the assurance that everything possible is being done to improve aesthetics and reduce pollution within the limits of technology and without too adverse an effect on rates. □



# the lonely vigil of the lighthouse man

by Lois Lane

"Sure it's a lonely life," says burly Gus Olsen, his voice reflecting his native Norway, his face the Canadian outdoors.

"But I'm content with it. Once I owned my own sawmill, north of Port Arthur, but the big operators got all the timber rights.

Then I went with Canada Car, but no contracts came in and I was laid off." He pauses as he rolls his cigarette on the kitchen table of the Snug Harbor range station.

"Saw they were looking for lighthouse keepers and I was looking for a steady job.

The advertisement said they wanted men who could operate diesel engines, who were handy with boats and had a knowledge of electricity."

That was 10 years ago. Since then, 63-year-old Mr. Olsen has seen duty at three



stations in Lake Superior, one on Lake Huron and is now chief lighthouse keeper at Snug Harbor radio beacon and range light station and also for Red Rock Light-house, 10 miles out in Georgian Bay.

As he talks, pleasure boats skim past the four-man station located on a small island at the mouth of Snug Harbor. A fishing boat pulls in with its catch at the tiny port, 30 miles north of Pary Sound.

But all the summer activity disappears with autumn. This is when the loneliness sets in.

Snug Harbor is the jumping-off spot for Red Rock, a formidable structure set solidly on a few square feet of rock. Its 250-watt light, reflected through a huge glass prism, can be seen 15 miles away.

Isolation describes Red Rock lighthouse to the essence. "There's many a balmy summer day the Department of Transport barge can't land at Red Rock," says Gus, "especially if the wind is from the south. You should be here in late fall. Sometimes the waves wash over the 65-foot tower and eventually she's coated in ice. Sometimes it's 10 to 12 days before we can get the men off."

This is the type of weather feared by Great Lakes mariners. Ontario has more than 2,000 miles of lake to keep safe for shipping. It's under the control of the Department of Transport's marine division, which from Beauharnois on the St. Lawrence to the tip of Lake Superior employs 161 lighthouse keepers.

These inland waters often surprise ocean captains venturing forth on the Great Lakes for the first time. Traffic in the narrow St. Lawrence and in congested Lake

Ontario is considered a hazard in itself, while Lake Erie's shallow waters and shifting shoals spell treachery. Lake Huron, especially Georgian Bay dotted with its thousands of islands, can be a mariner's nightmare. But the largest, Lake Superior can produce all the sound and fury of an Atlantic storm.

The protection offered the shipping companies is considered the best. Beeping radio beacons and range light systems dot the shores. A navigator receiving three different station signals can accurately check his position and plot his course. The range lights, burning 24 hours a day, shine directly on the shipping lanes and are an invaluable navigational aid.

For example, the range lights at Snug Harbor and the lights of another nearby station are situated so that they can be seen separately by passing craft. When the two lights apparently become one, the captain knows he must turn quickly to port. Ahead lie shoals and a possible shipwreck.

"One ship went aground here this spring," says Gus. The captain of the ore boat Glen Eagle was blinded by the sun and couldn't see the range lights. It took three days to unload some of the ore to another vessel before she was light enough to float off the rocks. She limped back to port with two big holes on each side of her bow.

As long as there have been ships there have been wrecks, and this fear has

prompted man to protect his craft. One of the ancient seven wonders of the world included the Pharos, a lighthouse built on the island of Pharos outside the port of Alexandria. Constructed about 200 B.C., this white stone structure was reportedly 460 feet high. A fire was constantly fed with wood by slaves who ran up and down the stone steps.

Bonfires were universally used to mark the shore at one time. However, as novel Daphne DuMaurier illustrated so well in "Jamaica Inn," navigators were often lured to their doom by wreckers who lit fires in the wrong place.

By the 16th century, lighthouses were becoming commonplace. It wasn't until 1793, however, that the first Canadian lighthouse was established at Louisa Nova Scotia—a stone tower 65 feet tall lit by a circle of oil-fed wicks.

Reflectors came into use toward the middle of the 18th century and by 1781 the first revolving light appeared in Sweden. The oil lamps and reflectors were attached to a vertical shaft rotated by clockwork. At this time, the common fuel for lights was whale oil. But colza oil, a vegetable product, was soon found to give a brighter flame.

All these developments soon found the way to Upper Canada's shores and bays. The first lighthouse on Lake Ontario was erected in 1808 at Gibraltar Point, marking the entrance to what is now Toronto Harbor. Local legend has it that this station is haunted by the ghost of the first keeper.





disappeared in 1815. He is believed  
have been murdered.

In 1835, there were four lights on Lake  
Ontario and one on Lake Erie. Expanding  
Great Lakes trade gave rise to the con-  
struction of a station on Lake Huron in  
1847 and in 1872 another lighthouse was  
erected on Michipicoten Island in Lake  
Superior.

Many of the lighthouses built before  
Confederation were of wooden construc-  
tion and burned mineral oil. This was a  
fuel for the stationary lighthouse,  
not for channel buoys, which by the  
middle of the century were using high-  
pressure acetylene serviced by a tender.  
However, the inevitable happened at  
Waugochishan in 1906 when a cylinder exploded  
and four crew were killed.

During this period, the Willson Buoy was  
erected in Ottawa. It used low-pressure  
acetylene in the form of calcium carbide.  
In today, many channel buoys run on  
cylinders of dissolved acetylene,  
which will last a year. Other buoys in  
the Great Lakes and the St. Lawrence are  
powered by electric batteries and  
have built-in automatic lamp changers.

Where there are lighthouses, there are  
fog horns. Before the advent of radar, fog  
was truly a sailor's nightmare. In the last  
century, it kept lighthouse keepers busy  
tending their boilers to keep their steam-  
powered fog horns groaning. Then came  
the siren, a fog horn employing com-  
pressed air. It was developed at the









University of Toronto in 1903 and its warning is still widely heard.

The next step is to automated fog warnings. The Department of Transport is testing electronic fog sensor that measures amount of moisture in the air and triggers the horn at a certain level.

One time, lightships were commonly used along the Seaway route. Crews would be aboard from June to December without relief, but the ships have been replaced by off-shore towers. Perhaps the best example is a tower built in 1953 at Long Point, on the eastern end of Lake Erie. It has all the comforts of a shore-based lighthouse, but looks surprisingly like what it replaced . . . a ship!

Lighthouses were still burning oil after the turn of the century. There were constant changes in equipment to reflect the light, but there was still no way a small flame could produce an intense light.

Electricity improved matters. Most Canadian lighthouses were converted before World War I. The electric filament lamp gave light of greater intensity, with or without

reflectors. Power was provided by direct hook-up to shore stations or by diesel generators on islands or in remote places. Most of Ontario's shore-based lighthouses now take their power from the provincial network, although they all have stand-by generation to operate their lights and radio in the event of an interruption.

Lenses have also been improved, thanks to plastics. In the past, costly hand-polished optical lenses were imported from Europe. Since 1960, replacement lenses have been made of plastic. In addition, the development of xenon lamps and flash tubes have provided mariners with a brilliant white light that no one can miss.

Times have changed for the lighthouse keeper, too. Today, he lives, like Gus Olsen, in well-appointed quarters with his radio receiver-transmitter keeping him in constant touch with headquarters and other stations. He stays at his post from the opening of the shipping season, usually in mid-April, until the ice forms in December. He works an 84-hour week, but has liberal time off after each spell of duty. His lighthouse is served by tenders from the Canadian Coast Guard and by helicopter.

But he's still isolated. Many think of inland waterway lighthouses as being accessible, but this is usually not so. Most are on islands or cribs (stilt-like supports) 10 to 18 miles offshore. Even the

ones on peninsulas such as at Long Point, jutting into Lake Erie, are separated from the outside world by miles of undriveable sand.

Are these men, the keepers of the light, a vanishing breed? Is automation pushing one of the last bastions of preferred isolation into oblivion?

"I think the lighthouse keeper as we know him today will vanish," says Jack Kennedy, superintendent of navigational aids at Parry Sound. "But there will be a new breed, the electronic technician replacing our present keepers as they retire. As more and more of our stations become automated, the equipment will require this type of personnel."

Technology, in fact, is fast catching up with the lighthouse keeper. For instance, although there are as yet no nuclear-powered lighthouses in Canada, Atomic Energy of Canada Ltd. and the Department of Transport are developing a buoy light powered by the isotope cobalt-60.

Nuclear devices have the obvious advantage that they will run for years without refuelling, and in this respect the United States scored a world first in 1964 with a nuclear-powered lighthouse guarding Chesapeake Bay, Maryland.

It is lit by a 60-watt generator developed by the US Atomic Energy Commission and will operate unattended for 10 years. □

*Gus Olsen is chief lighthouse keeper for both Snug Harbor radio beacon and the more remote Red Rock lighthouse, below. Other photos show the unusual configuration of the Prince of Wales lighthouse in the St. Lawrence — one of the most powerful beacons in North America — and the innards of Lake Erie's Long Point lighthouse.*





# a breed apart

by Charles Law

*Experimental fast breeder reactor at Dounreay, in Northern Scotland.*

As scientists delve into the microcosm, nuclear physics looks increasingly like a bag of conjuror's tricks.

Talk of anti-matter and such way-out particles as mesons and muons may whet the appetites of sci-fi fans, but for the down-to-earth, feet-on-the-ground plodder the inner workings of the nuclear reactor are difficult enough to comprehend. This holds particularly true for the "fast breeder" type of nuclear reactor, which has the startling ability to produce more fissionable material than it consumes.

Not that fast breeders are anything new. In fact, the first reactor to produce electrical power at the Argonne National Laboratory in the United States in 1951 was a fast breeder. Other breeder reactors are now operating in America, Britain, Russia and France. But as yet there is no breeder reactor capable of producing electric power on an economic basis.

Even while scientists worked on the Manhattan Project 25 years ago, they dreamed of making more efficient use of the world's seemingly scarce supply of uranium.

Conventional reactors employ graphite, water or beryllium to slow down or moderate





the fast neutrons released upon the fission of U-235 atoms and thus promote a chain reaction. They also create a certain amount of new fissionable material because some of the neutrons are captured by U-238 atoms, converting them to fissionable plutonium-239.

These reactors consume only a small fraction of their total fuel loading. One of the most efficient — the Canadian type of natural uranium, heavy water reactor — utilizes only about one per cent.

The amount of uranium 235 in relation to the more abundant uranium with an atomic weight of 238 may be artificially increased by a process known as enrichment. In fact, many reactors are designed to run on enriched uranium. Although a rather percentage of the total amount of fuel in the reactor is then consumable, the substantial quantities of U-238 are discarded at the enrichment stage that

this method is even less economical on fuel resources.

Because of their ability to change U-238 into plutonium-239, conventional reactors are known as converters. They produce less fissile material than they destroy so that the amount of usable fuel in the reactor decreases with operating time. Breeders, on the other hand, produce more fissile material than they consume.

Theoretically, a breeder reactor should be capable of converting all its supply of U-238 into plutonium. In other words, it could fission all the uranium mined (in practice, various losses would probably reduce this to a more meaningful 70 per cent).

Key to the amount of U-238 converted to plutonium is the number of neutrons available in excess of those required to maintain the chain reaction. As early as 1944, it was evident that the fissioning of plutonium released a larger number of excess neutrons in an unmoderated or "fast" reaction than in a thermal or "slow" reaction. The earliest fast breeder released high-speed neutrons into a natural uranium blanket, producing more fissile material than it consumed. An alternative method is to use a blanket of thorium, which is transformed into fissionable uranium-233 when bombarded with neutrons. Some later designs have dispensed with a blanket entirely.

The pot at the end of this particular nuclear rainbow is cheap electricity. But how credible is the goal?

Atomic scientists insist that the prospects are encouraging — provided there is sufficient time to overcome the technical barriers and a willingness on the part of government to spend money on developing commercially attractive breeders. Size is another important factor. If reactors of the 10,000,000-kilowatt magnitude could be absorbed into a grid in one gulp (not an unreasonable assumption in view of predicted power demands in the next few decades), the capital cost of breeders would be dramatically reduced.

It's in the fuel cycle, however, that the big savings are foreseen. If the doubling time — the time required for the fissile content of the fuel to increase to twice its original concentration — is sufficiently short, purchases of enriched uranium for the core would be unnecessary and operating costs would drop dramatically. Fissile material might even be removed from one core to fuel a new breeder.

Obstacles to the design of successful breeders start with materials, which must withstand the extremely severe operating





conditions inherent in a flux of fast neutrons. Fuel elements are subjected to great stress by high temperatures and long burn-up periods. Up to now, liquid sodium has been found a more effective coolant than either steam or other gases, but sodium has its own peculiar problems.

At least one Canadian scientist, AECL's senior vice-president Dr. W. B. Lewis, has asked whether his peers aren't counting too heavily on these so-called "thoroughbred" breeders as the way to economic operation. His alternative is a hybrid, making use of a smaller fast reactor in a heavy water-moderated system fuelled with thorium.

"It would seem much more promising to build a hybrid combining the valuable features of the different types of reactors, to optimize the economics, than to hold out against the economic pressures in the interest of achieving a thoroughbred."

Canada's nuclear program hasn't advanced into the breeder stage yet. It has been found that the expense of developing the Canadian-type reactor is about all a country with our population can afford. In any case, it may be another 30 years before breeders are a commercial reality.

Were Canada to join the fast breeder club, she would probably do so in a unique manner. Within the next few months, AECL will have an experimental liquid metal cooling system in operation. Rather than sodium, it uses a mixture of lead and bismuth. These two metals were originally selected because Canadian scientists wanted to use them for the target area in the planned Intense Neutron Generator (ING). However, the government cancelled the ING project because of the cost.

Despite this, interest in the heat transfer potential of lead and bismuth has not been quelled. Other laboratories have shown that liquid bismuth has better nuclear properties than sodium. Unfortunately, it swells upon solidification. The addition of lead reduces this characteristic.

Apart from the fission or splitting of atoms to release large amounts of energy, two other methods of obtaining controlled nuclear power are at least theoretically possible. One is fusion — the formation of a larger particle from two or more smaller particles. Its best known illustration is the H-bomb, in which the key reaction is the fusion of deuterium at temperatures in the millions of degrees. As yet, this has only been possible if there is a fission trigger to generate the fantastic temperatures at which fusion occurs.

The other is spallation, a further method of releasing neutrons. Back in 1948 at

Berkeley, California, it was discovered that a beam of ultra high energy protons would split such heavy elements as lead, bismuth, uranium and thorium.

Instead of two or three neutrons per impact, as many as 20 neutrons would "boil off" with an attendant release of incredible amounts of energy.

The lid of secrecy was clamped on the phenomenon almost immediately and it wasn't until 1963 that AECL proposed the building of ING for research into particle physics and the effects of spallation.

Since the input is not fissile uranium or plutonium but electricity powering the magnets of giant accelerators, spallation is independent of cost and availability of radioactive materials. And so the idea was dubbed "electric breeding."

At present, electric breeding is right out of the picture. Accelerators built or conceived so far have been for university research. The emphasis has not been on the efficient conversion of utility-supplied electric power into radio frequency power or other forms needed to accelerate particles to very high energies. As an example, for very brief periods the cancelled ING project would have consumed as much power as a city of 100,000 people and taken about \$21 million a year to operate.

There is a further theory in the minds of scientists that could lead to a new means of acceleration. They see the glimmer in a principle called "ion drag". Electrons are capable of greater acceleration because of their small size. And if their negative charge could be used to drag the heavier, positively-charged protons behind them, accelerator efficiency would be greatly increased. Dr. Lewis uses the analogy of a saucerful of marbles on a train. "Given sufficiently gradual accelerations, the marbles will stay in the saucer and acquire the velocity of the train," he says.

Canadians may be forgiven for being blasé about the idea of fast breeders and their promise of extremely cheap power. Our economy has been nurtured on low-cost hydraulic energy yielded by fast-flowing rivers. Others in the world have been less fortunate. Cow dung is an almost universal domestic fuel in India, for example.

But even in Canada, hydro-electric power must now be supplemented and massive nuclear stations are becoming the style.

With this kind of a push, dreams of a few decades ago will be forced into reality. □





*Ontario Hydro and Deutsche Bank representatives sign the transaction papers for the recent \$40 million bond issue in West Germany.*

# BONDS

## building blocks of power

by Paul Chisholm

Meet Joe McSwartz . . . all-Ontarian, average Ontarian.

Joe earns \$119.64 a week, works hard for the future of his 1.7 children and hopes to own his trim suburban home outright before he retires. One-third of a car, statistically speaking, takes him to and from work, three-quarters of a TV set provides most of his entertainment, and 43.7 per cent of a telephone services his home.

Overweight for his age and height, Joe is among the world's best fed; and he

tipples an astonishing 17.1 gallons of liquor, beer and wine every year. (Come winter though, he will no doubt "really" start reducing and get with the 5B-X program).

Joe, indeed, is so darn ordinary you probably wouldn't want your daughter to marry him — his theoretical existence is straight from the reams of cold statistics compiled by average-people creators. But if Joe is average, he is precisely the type of thrifty individual whose savings Ontario Hydro relies upon to finance its



mammoth expansion and construction programs.

Big League capitalists — and those who would like to be as big — provide approximately half the multi-million dollar financing Hydro requires each year for new generating, transmission and distribution equipment to meet power needs which double every decade. But drawing from their nest eggs, old socks hidden under mattresses or regular savings accounts, the next best customers for Ontario-issued Hydro bonds to finance the bulk of expansion and pay off earlier debts are (wait for it) average Ontarians.

Hydro bonds, issued in denominations ranging from \$500 to \$100,000 are simply fixed debts which earn interest for the lender over a specific loan period. Since World War II, Hydro has raised an average of \$150 million annually through securities issued on the Canadian, US and European markets — the equivalent of \$20 for every man, woman and child in the province.

Such indebtedness might appear extravagant to the McSwartzes of Ontario, many of them feeling the pinch in just trying to keep up with the Joneses.

"Of course, there's little relationship between corporation and domestic budgeting practices," says Hydro treasurer Len Farmer. "A continuing debt is accepted practice for the modern business corporation."

Hydro must borrow if it's to serve the needs of fast-growing Ontario. But it has to compete with other public and private organizations for the savings of individuals, whether through direct investment or indirectly through major institutions such as insurance companies and pension funds, and the temporarily idle cash of corporations and government.

Which is where inflation comes in. With the so-called inflationary psychology making investors wary of putting their money into fixed-interest securities for fear the upward spiral of wages and prices will erode their nest-egg, progressively higher interest rates have been offered to attract money in recent years.

Interest rates on Hydro bonds rose from two per cent in the 1940s to five per cent in the 1950s. This year a Hydro bond issue carried an unprecedented interest rate of 8½ per cent.

Unlike privately-owned corporations, Hydro is unable to add such sweeteners to bond issues as warrants or conversion

\$1000

\$1000



## THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

GR-K00000

GR-K00000

7% BOND DUE 18TH SEPTEMBER 1992  
(SUBJECT TO PRIOR REDEMPTION)

ISSUE OF SIXTY-FIVE MILLION DOLLARS (\$65,000,000) IN PRINCIPAL AMOUNT OF BONDS OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO, BEARING INTEREST AT THE RATE OF SEVEN PER CENTUM (7%) PER ANNUM AND PAYABLE ON THE 18TH DAY OF SEPTEMBER 1992, SUBJECT TO PRIOR REDEMPTION; MADE UNDER THE AUTHORITY OF THE POWER COMMISSION ACT, R.S.O. 1960, CHAPTER 300 AND AMENDMENTS, AND OF AN ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL.

GUARANTEED AS TO PRINCIPAL AND INTEREST BY THE PROVINCE OF ONTARIO.

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO (hereinafter called the "Commission") for value received hereby promises to pay to the bearer or if registered to the registered holder hereof on the 18th day of September 1992, or on such earlier date as this Bond may be redeemed in accordance with the provisions for redemption hereinafter set forth, on presentation and surrender of this Bond, the sum of

ONE THOUSAND DOLLARS

in lawful money of Canada at any branch of any Chartered Bank in the Province of Ontario or in any of the Cities of St. John's, Halifax, Charlottetown, Saint John, Quebec, Montreal, Winnipeg, Regina, Calgary, Edmonton, Vancouver or Victoria, Canada, at holder's option, with interest thereon from the 18th day of September 1988 at the rate of Seven per centum (7%) per annum payable half-yearly in like money at any of the said places at holder's option on the 18th day of March and September in each year of the currency of this Bond on presentation and surrender of the interest coupons hereto annexed as they severally become due.

The Commission shall have the right at its option to redeem the Bonds of this issue, either in whole or in part, in advance of maturity, on any interest payment date on or after the 18th day of September 1988, at the places where and in the money in which the said Bonds are expressed to be payable, upon payment of the principal amount thereof together with interest accrued thereon to the date of redemption, and upon giving previous notice of such redemption by advertisement once in at least one City in each of the Provinces of Canada in a daily newspaper of general circulation published in such City, such notice to be advertised as aforesaid at least thirty (30) days before the date fixed for redemption. In the event that less than all of the said Bonds shall be redeemed, the Bonds to be redeemed shall be chosen by lot in such manner as the Commission may deem equitable, and for the purpose of redemption and selection for redemption, each Bond of a denomination greater than \$1,000 may be deemed to consist of the appropriate number of units of \$1,000 each and any part of the principal amount of such Bond comprising one or more of such units may accordingly be selected and called for redemption. In the event of the selection for redemption of a portion only of the principal amount of any coupon Bond, payment of the redemption price of such portion will be made only upon surrender of such Bond in exchange for a fully registered Bond or Bonds of this issue for the unredeemed balance of such principal amount.

This Bond is subject to the Conditions endorsed hereon which form part hereof.

This Bond is issued under the authority of The Power Commission Act, Revised Statutes of Ontario, 1960, Chapter 300 and amendments, and of an Order of the Lieutenant Governor in Council.

IN WITNESS WHEREOF the Commission has caused its Corporate Seal and the engraved facsimile signature of its Chairman or a Vice-Chairman to be affixed hereto and this Bond to be duly signed by an Authorized Signing Officer of the Commission and to be dated the 18th day of September 1988.

### GUARANTEE BY THE PROVINCE OF ONTARIO

BY VIRTUE OF THE POWERS CONFERRED BY THE LEGISLATURE OF THE PROVINCE OF ONTARIO AND OF AN ORDER OF THE LIEUTENANT-GOVERNOR IN COUNCIL, THE PROVINCE OF ONTARIO HEREBY GUARANTEES TO THE HOLDER FOR THE TIME BEING OF THIS BOND AND TO THE HOLDER FOR THE TIME BEING OF ANY OF THE COUPONS ATTACHED THERETO, DUE PAYMENT OF THE PRINCIPAL OF THIS BOND AND OF THE INTEREST THEREON ACCORDING TO THE TENOR OF THE SAID BOND AND OF THE COUPONS ATTACHED THERETO.

*Len Farmer* SPECIMEN

TREASURER OF ONTARIO

*George* SPECIMEN  
CHAIRMAN

SPECIMEN

AUTHORIZED SIGNING OFFICER

PRINTED IN CANADA

CANADIAN BANK NOTE COMPANY LIMITED



its to common stock. Neither can an electrical utility postpone major projects, at least so long as the economy continues to expand and push up power demands.

Hopefully, anti-inflationary measures now being pursued by most countries in the western world, but particularly by the United States, will cool the economy in the coming months and return some equilibrium to the long neglected bond market.

With interest rates so critical, Hydro shops carefully before floating a loan. At times, the US market is more attractive than the Canadian and \$475 million has been borrowed on Wall Street in the past five years to finance the province's power network. Earlier this year, when North America's interest rates skyrocketed, Hydro went to the European market for the first time and raised approximately \$400 million in West Germany through a 15-year, seven per cent bond issue.

Interest rates aside, the attractiveness of Hydro bonds lies in their security. Ontario Hydro's revenue from the sale of energy to direct industrial and rural customers is paid to the municipalities for further distribution provides the cash for interest and principal to be repaid in full. In any case, the provincial government guarantees each bond issue.

Of course, it's essential to maintain the confidence of the investment community in Ontario Hydro as a well run, efficient organization. While power is produced and sold to the province on a non-profit basis, the bonds must be continually kept in line with current costs.

Further insurance is provided by a fund for emergency situations such as loads falling below forecasts, fluctuations in the dollar exchange rate, major damage to power plants and equipment and unexpected increases in falling water levels, all of which may affect the cost of power. At present, the fund stands around \$183 million.

Old Banks, assistant general manager — believes that a less prudent financial policy would be detrimental to borrowing of money. "Drawing on reserves to avoid a rate increase, for instance, would in my view be a highly sound practice which would be quickly reflected in the bond market," he says. "We might experience particular difficulty in New York where we have to provide so much material with the Securities Exchange Commission."

The process of floating a bond issue usually begins when the Treasury Division forecasts Hydro's financial position for the year. At the appropriate time — several months a year — details are worked out with representatives of the provincial

government and the investment syndicate handling distribution to financial houses and ultimately the McSwartzes of Ontario and elsewhere. A multi-page prospectus outlines the purpose and details of the bond issue, a history of Hydro and its financial obligations. Offerings made in the United States also comment on the state of the Ontario economy.

Two bank note companies in Ottawa produce the actual bonds. And each of the thousands of bonds in an issue must be signed by Mr. Farmer or another authorized treasury representative.

Even with the aid of a special pressure pen which enables 20 signatures to be made at a time, this exercise takes days to complete. As the signature is made on one bond, it is repeated by additional pen heads on nine bonds laid in line above, and 10 alongside.

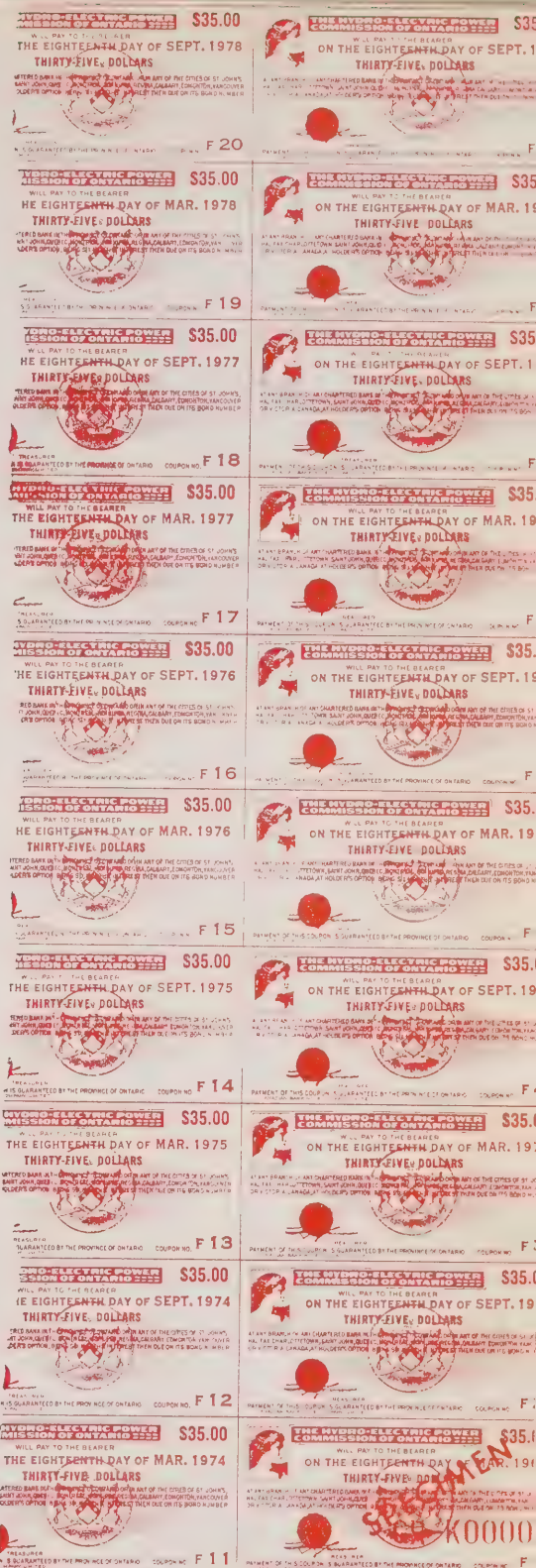
Hydro's official bond signatories have had to change their writing styles to cope with the pens, which remain synchronized only for a run-through signature without dotted "i's" or crossed "t's."

In most cases, Hydro bond issues are fully subscribed within a few weeks. Fully registered bonds in denominations of \$500, \$1,000, \$10,000 and \$100,000 are the most popular. These bonds are registered by Hydro to protect the holder if stolen, and interest is sent by cheque twice a year.

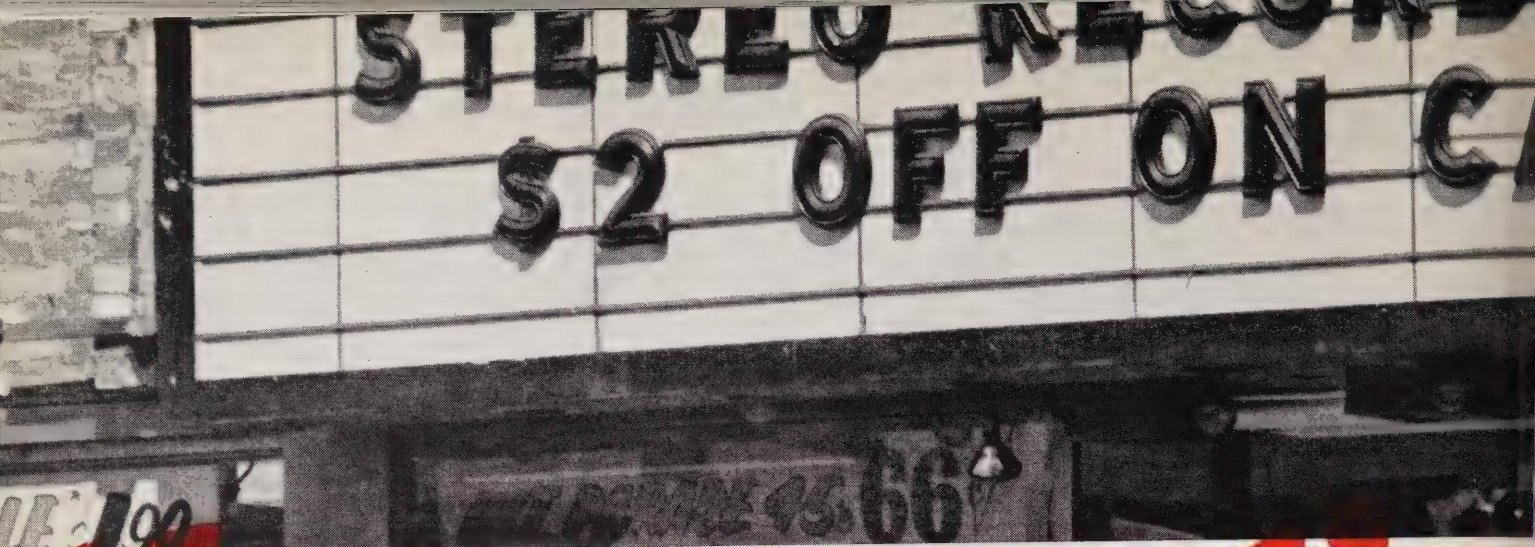
Negotiable bonds, in lots of \$500, \$1,000 and \$25,000, contain a series of coupon squares, each representing six months of the bond's life. The coupons are surrendered when interest is paid at a bank. To meet unforeseen situations, the purchaser can sell either type of bond for its current market value at any time.

Harbor commissions, provincial governments, lodges, burial societies and small businesses are among other regular buyers of Hydro bonds. Reflecting the structure of Canadian society today, slightly more than half the individual buyers of bonds on the local market live in urban, rather than rural areas.

Like motherhood and the parking meter, it seems, corporate indebtedness is here to stay — an integral part of being a going concern. Being debt-free would indicate a static Hydro and province, and the average Ontarian certainly wouldn't want that. Eh, Joe? □







# the secret's

"Fantastic! It's the biggest thing to hit the music business!" The superlatives are those of Sam Borstein, manager of a leading Toronto record store. But they could equally have been uttered by anyone in the contemporary stereo scene.

Tape, it seems, is in. Of course, tape has held a relatively small band of disciples in its magnetized coils for years. Only now, it has leaped suddenly to the top of the electronic pops. And the secret lies in the package.

Whether they're pre-recorded with the latest hit tune or anticipatedly blank, today's tapes can be bought in handy cassette

or cartridge form that dispenses with muttered oaths and fumbling with over-size reels. Insertion of a cartridge capable of playing eight stereo programs is so simple it can be performed while driving the car — that's where most of them are anyway — while a cassette model can be upended, even tossed into the air, and it will still continue to play.

Not that the reel-to-reel type of tape recorder is doomed to extinction. "Far from it," says Paul Moores, director of consumer products for Ampex of Canada. "Increasingly, it looks as though the

sophisticated audiophile will continue buying reel-to-reel."

However, despite the quality reproduction of reel-to-reel machines, the public at large is plumping for the convenience of the cartridge and cassette.

Retail sales of 8-track cartridges went from \$846,000 in 1967 to \$3.1 million last year and may reach a predicted \$8.2 million for 1969. Cassettes, which two years ago accounted for sales of \$90,000 should reach an expected \$1.5 million this year.

It's still too early to say whether the avalanche will engulf the record market.





# R TAPES

## in the pack

st of the big labels now market their  
s on tape (in any case, the original studio  
ording is taped before being trans-  
ed to a master record).

though tape accounts for about 20  
cent of our business, record sales seem  
be going hand in hand," says Mr.  
stein, who runs the A and A record  
e in Toronto.

ople who have a turntable at home  
buying 8-track equipment for their car."  
ever, a significant increase in the  
nber of home tape recorders could  
ardize the sale of records, he says.

Up to now, the quality sound of 8-track  
has outstripped reproduction from the  
cassette because of its faster playback  
speed (3¾ inches per second against 1⅞).  
Proponents of 8-track have said the  
cassette concept is ideally suited to portable  
voice recorders, but of limited use for  
hi-fi reproduction. But the makers of  
cassette machines say the stepped-up  
wattage and improved frequency response  
of their latest home stereo units will  
reduce the fidelity gap.

Electronics technology being what it is,  
no one can say where performance, fidelity  
and miniaturization will end. Certainly,

every year sees marked improvements in  
reproduction and quality.

It's all a far cry from that day 90 years  
ago when Thomas Edison cranked a  
cylinder wrapped in tinfoil and shouted  
"Mary had a little lamb" into a crude trans-  
mitter. He cranked the cylinder again and  
the machine spoke. "I was never so taken  
aback in my life," he admitted later.

For years, the phonograph remained little  
more than a toy. Edison had turned his  
attention to the production of an incandes-  
cent electric light. His tinfoil cylinders







classics and pops. In fact, the number of tasks to which it can be put seem limited only by the imagination.

In education, for instance, cassette tape recorders are getting increasing mileage in everything from taping lectures to the teaching of English to New Canadians. And in the States, the market has already seen the appearance of kits of instruction books and cassettes on topics that might range from "How to play golf" to "How to build a patio."

The Canadian National Institute for the Blind has used "talking book" tape cassettes since 1961. These were developed in Britain, measure about 12 inches across and play for around 16 hours. Specially-designed cassette machines for both recording and playback functions have been available to the blind since 1967.

Today, more and more people are using cassette tape for interviews and as a sort of electronic memo pad. Composer Harry Somers, who does a great deal of work with reel-to-reel tape in the composition of electronic music, said he was thinking of acquiring a cassette machine before leaving for a year's stay in Italy. "I think it would be extremely useful. I'm seriously thinking of getting one for personal notes," he added. Interviewer Betty Kennedy took a cassette recorder to Texas to interview six Canadians connected with July's moon shot. "The reproduction was excellent," a CFRB spokesman said later.

Radio stations have been using special cartridge tape for a number of years for

most of their announcements and commercials. These endless loops carry a cue track that automatically winds on the tape to the beginning of the commercial for use next time. For music programming, the stations prefer records. They claim that pre-recorded tape runs too slowly and contains too many tracks to give the high fidelity essential to broadcasting.

While the stations rate car drivers high on their list of listeners, they do not regard in-car tapes as a serious threat. They point out that radio offers not only a more varied musical selection, but news, sports, weather and favorite personalities as well.

"Sure, anything that has you listening to something other than radio is competitive," says Jerry Maccabe, a CFRB vice-president. "If you have a beautiful girl in the next seat, that's competition, too."

Yet another electronic package that may have equal if not more far reaching effects than the tape cassette is EVR, or Electronic Video Recording. This is a system for storing audio visual programs for later display through a standard television set. Any movie, videotape or live television presentation can be recorded on EVR film for later distribution and playback. The system is now being introduced in Canada.

EVR film is contained in a circular cartridge which is placed in a special player connected to the TV antenna terminals. The television set is tuned to a non-operating channel and the player switched on.

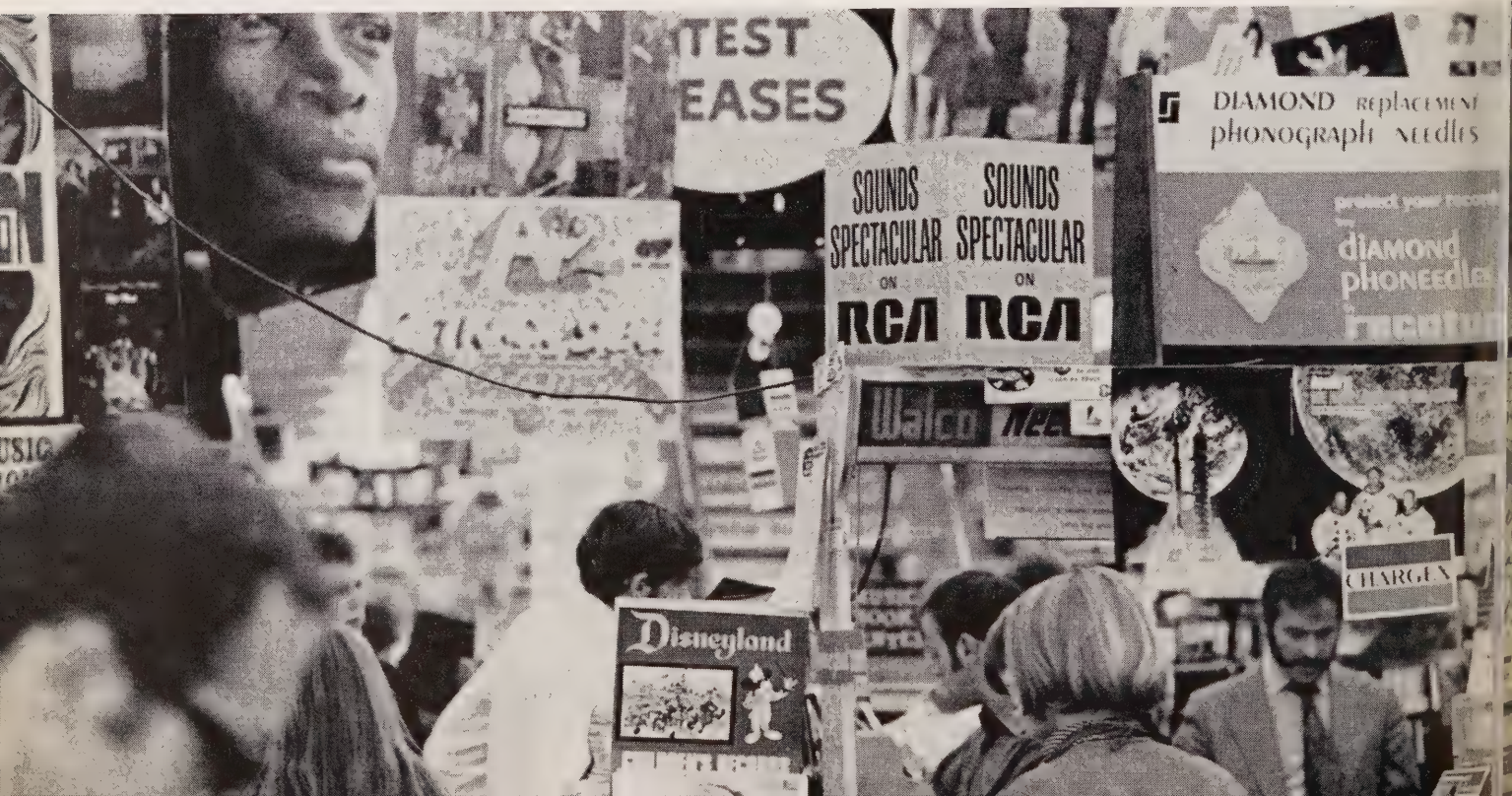
At the moment, the picture is black and white. But a system that will reproduce color is already on the horizon. □

*"Talking book" cassettes sent out by the Canadian National Institute for the Blind give 5,000 blind people access to their favorite books.*

played for little more than a minute and their message was understandable only if it was known beforehand. It was from this machine, though, that the modern record player evolved.

The use of a moving magnetic wire for reproducing audio signals was first demonstrated in 1898. But only after the second world war were the theories, techniques and materials sufficiently developed to permit satisfactory results. Now magnetic tape, consisting of a paper or plastic base coated with a thin layer of iron oxide, is almost universally used.

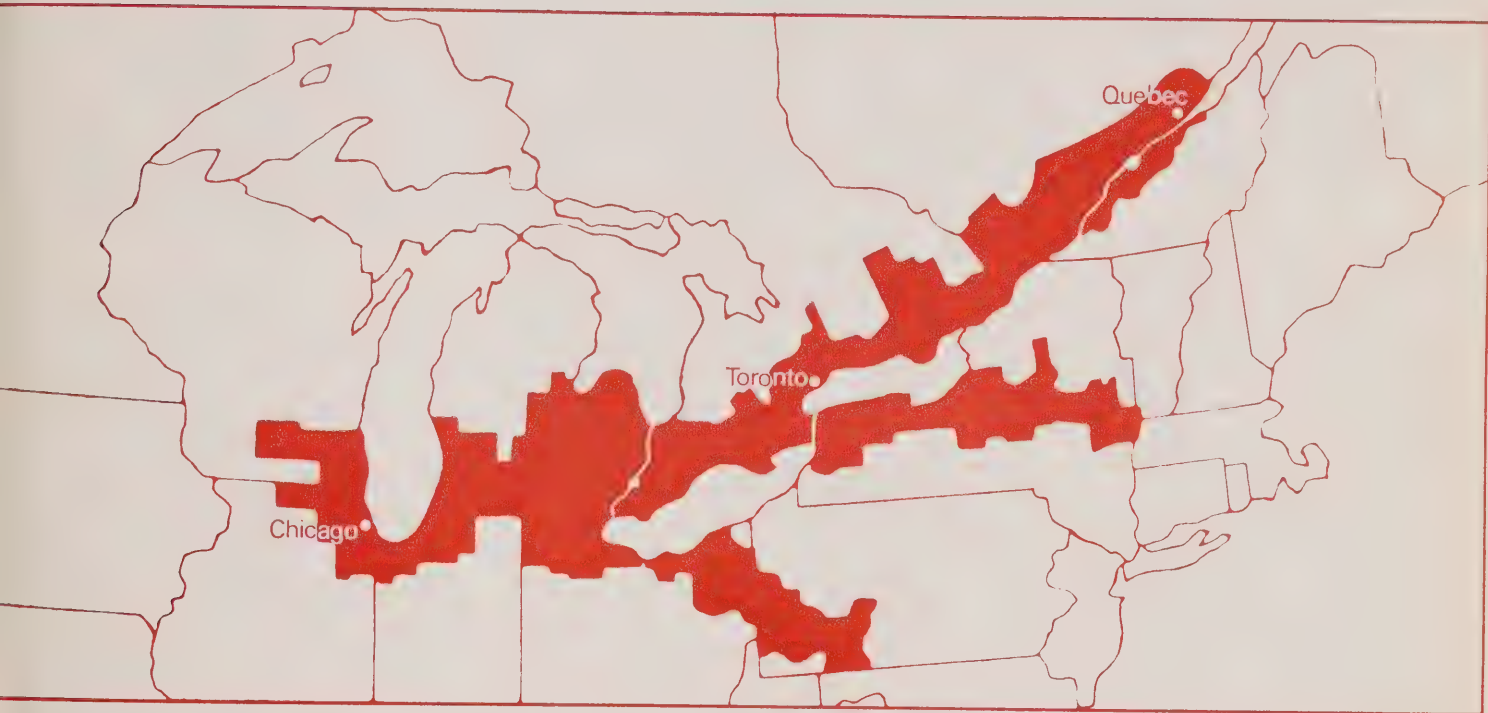
Packaged tape is so versatile that it's far from restricted to the long-haired world of





# Chicago to Quebec

## one vast city



*The Great Lakes megalopolis in the year 2000*

urban area stretching from Chicago in the west to Quebec City in the east with a population of 120 million?

As fantastic as it sounds, W. J. Pearce, communications director of the Detroit Edison Company, says that's what we can expect by the year 2000. He made the prediction at the 25th annual meeting of District 8 of the Ontario Municipal Electric Association at Wallaceburg.

Mr. Pearce told delegates that the Detroit area and the Ontario counties of Essex, Kent and Lambton would be at the heart of what has been named "the Great Lakes galopolis."

His revelations were based on a study begun in 1965 by Detroit Edison, Wayne State University and Greek urban planning expert Dr. Constantinos A. Doxiadis.

According to the study, the Great Lakes megalopolis will rank second (the Rhine Valley is first) in a list of 10 massive urban areas that will exist in 2000. The urban Detroit area, which will cover 23,000

square miles (Southeastern Michigan, Southern Ontario and Northern Ohio) will double its population to 15 million by the end of the century. World population will also show the same percentage increase — from today's 3.5 billion to 7 billion.

To help to cope with this population push, the theorists envision a grid system of north-south and east-west corridors organized on a national, regional and urban basis. The main feature of the corridors would be transportation in its broadest sense — not only goods and people but electric power, water and other services.

High-speed electric trains on the national corridor would travel the length of the megalopolis at 400 miles an hour. A rapid transit system would serve the regional corridors while more conventional vehicles would operate on the metropolitan routes.

Mr. Pearce said most transport would be automated. It would be underground in the urban cores, leaving the surface for pedestrians. "At present," he said, "the

automobile takes up 74 per cent of Detroit's core." He was including parking lots, lanes, streets and other auto-oriented functions.

"Thirty years ago we underestimated the growth of today," he added. "Let's not repeat the same mistakes. Let's plan for the world this study reveals."

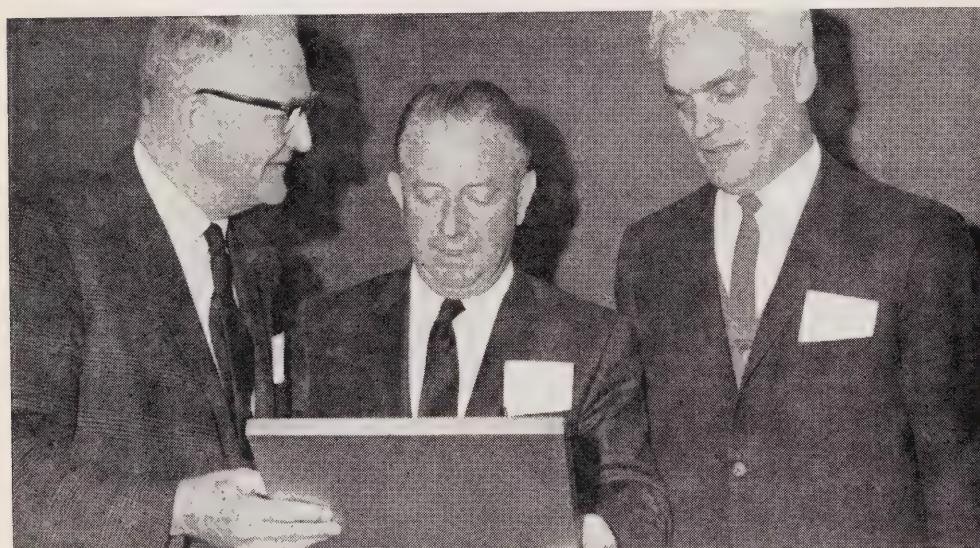
Earlier in the meeting, two resolutions were passed by the 85 delegates. Both came from Windsor Utilities Commission.

The first asked the OMEA to take immediate action to have the Public Utilities Act amended to allow commissions to appoint a successor where vacancies occur on the commissions. At present, the Act stipulates that the municipal council make the appointment. Windsor commissioners feel that the elected utility representatives are in a better position to pick a successor. They also stated in the resolution's preamble that the present Act places restrictions upon a utility or Hydro commission which do not apply to other elected bodies.





*New OMEA District 8 executive includes: top row, H. J. Donais, secretary-treasurer, Tilbury; Fred DeSantis, Kingsville; H. G. Morrison, past president, Chatham; and A. B. Cousins, Wallaceburg. Seated, B. R. Roy, 1st vice-president, Windsor; J. G. Young, president, Tilbury, and M. J. Evans, 2nd vice-president, Point Edward.*



*Flanked by two presidents — Henry Baldwin, of the OMEA, and Jack Anderson, of the AMEU — B. R. Roy, of Windsor, admires his certificate denoting 15 years as a commissioner. Mr. Baldwin made the presentation.*

The second resolution also requested a change in the Public Utilities Act. It urged the OMEA to seek an amendment to enable local commissions to establish their own remuneration.

At present, the Act gives this power to municipal councils. □

## pr — and buying a good suit

Public relations and clothing stores sound like a strange mixture, but W. C. Pearson, of Strathroy, put the analogy to good use at the District 7 OMEA fall conference in Exeter.

"In associating with a reputable clothing store over the years, a customer develops a confidence in the merchant's judgment in the matter of clothes," said Mr. Pearson,

chairman of the district's public relations co-ordinating committee.

A bad or instant public relations program was like a merchant who put too large a suit on a customer, gathered handfuls of material at the back, then stood the customer in front of a mirror and told him how good it looked.

Turning to the relationship between utility and municipal council, Mr. Pearson said one of the problems was the matter of responsibility. "If both bodies know where their responsibility begins and ends, the relationship is good. If not, it's touchy."

Informal get-togethers on a fairly regular basis, including perhaps an annual dinner, might be a good forum for the interchange of ideas. More formally, utilities might communicate with councils by letter.

"This reinforces what the mayor or reeve has to tell council as their representative on the commission," Mr. Pearson added.

It also, he said, removed some of the burden from the mayor's shoulders. Mr.

Pearson pointed out that the main purpose of the mayor was to serve all the people in his municipality. Something he was in favour of when wearing his commissioner's hat might not look the same when wearing his council hat.

Guidelines of action in the commissioner council relationship were in the mail to individual utilities, he said, for inclusion in their public relations manuals.

Earlier in the meeting, delegates saw skit that zeroed in on two different approaches a municipal commission might make toward a letter from Ontario Hydro saying that interim rates were going up. In the first approach, a call from the local newspaper about the increase evoked harsh comments and condemnation of the provincial utility. In the second, the newspaper editor was told that the commission had not had time to study the letter and effect upon local rates. A return call would be made when the commission had something more concrete to say.





Heading OMEA District 7 are: top row, C. V. MacLachlan, secretary-treasurer, Ingersoll; F. T. Julian, 2nd vice-president, Woodstock; W. R. Gifford, Aylmer, and M. A. Greene, Exeter. Middle, P. R. Locke, hon. vice-president, St. Thomas; G. H. Hess, Zurich; Bob Austin, 1st vice-president, Arkona, and G. D. Lang, St. Thomas. Seated, Elmo Curtis, past president, London; Ross Fewster, president, Ingersoll; H. F. Baldwin, hon. vice-president, and George Gathercole, hon. president.



R. E. Pooley, left, of Exeter, and M. M. Pennington, right, of Parkhill, were presented with 15-year certificates by OMEA president Henry Baldwin at the District 7 meeting.



W. C. Pearson, of Strathroy, compared public relations to a good suit at the District 7 meeting. And Guy Morrison, of Chatham, tried out a "Louisville Slugger" during a District 8 tour of Wally Enterprises.







here's wishing the tree farmers...

# Millions of Merry Evergreens And Another Bumper Year

story and photos by Nick Nickels

Christmas is coming and the hearts of men are getting fat with the joy of celebrating the greatest of Christian festivals.

Preparations for the magic season suddenly blossom in colored lighting, baubles and greenery during the final week. Fairyland decorations appear in millions of Metro homes, in high-rise apartments, in humble cottages and lonely farm houses, in isolated loggers' shacks with a swag of cedar boughs hung above the door, and in the mess halls of polar stations where Christmas candles have been parachuted through the winter blackness to homesick weathermen.

Nearly every display, greenery in some form is basic, a fact pointed up by business weeks before the actual date.

Even if six weeks seems premature in first displaying greenery in the stores, it's but a short interval in the 10-year span from planting of tiny seedlings to the harvest of six-foot trees.

Whatever it may be, but it's big business. In 1968, Canada grew for export Christmas trees valued at more than \$100 million. Ontario, Quebec and the Atlantic provinces combined (Newfoundland and Prince Edward Island excepted) produced roughly one-third of the total amount. The domestic market gobbled another 2.5 million trees.

Where in Ontario are Christmas trees grown?

Head teacher Clarence McKague runs a small nursery near Castleton.

"All over them friggin' sand hills," an itinerant truck driver from Nova Scotia grumbled.

Early in November, he was hauling 250 trees at a time from a small hill plantation to Burketon railway siding, 15 miles northeast of Oshawa. There, a small gang of fellow workers from Newfoundland and Quebec graded and loaded the trees into a line of box cars for early export.

Most trees, however, are exported fresh cut and compactly bound in tractor-trailer rigs to distribution points in the US. Some trees are unloaded in New York later to be dispatched to Caribbean and South American ports. Smaller shipments are air-lifted to South Vietnam, South Korea and Canadian and US military outposts around the globe.

An estimated 600 tree harvesters earn about \$80 for a seven-day week from mid-October until nearly Christmas. They work in anything from small plots to vast blocks of trees that thrive on the sand ridges of Southern Ontario. These great glacial fallouts straggle from Kemptonville through Castleton, Millbrook, Pontypool, Burketon, Uxbridge, Orangeville, Camp Borden and Dundalk. The ridges branch northward from Orillia to North Bay and deteriorate into sandy pockets on the Laurentian Shield west of Sudbury.

The sandland ridges once nurtured white pine, which was ravaged by pioneer lumbermen. The ridges all but blew away until Christmas tree plantings over the past two decades succeeded in anchoring them down. This semi-desert strip in Southern Ontario is also used to grow

prime tobacco and potatoes (400 bushels to the acre).

Scotch pine accounts for 87 per cent of the plantings, white spruce 10 per cent and balsam three per cent.

They are grown in small acreages by hopeful, but absentee owners. The big operators are nearly all American with huge parent plantations located in New England, below the western Great Lakes and in Washington State. They maintain up to 1,000-acre blocks in Southern Ontario and supplement their market demands by buying prime trees from smaller growers.

Because of the competition, the small absentee fellows who cannot afford to properly look after their hit-and-miss holdings are fast going out of business. This is reflected in a decreasing harvest each year.

"With the slow-down in plantings, a drop is expected by 1973 in the number of quality trees available for market," says E. F. Johnston, of the Ontario Department of Lands and Forests.

Actually, it's a wonder that Christmas tree production is as flourishing as it is. Both nature and man take their toll.

Deer and rabbits browse on the winter foliage. Mice nibble at the tree trunks and







es are bound with twine or wrapped in plastic  
ting on the spot. Then they're hauled out by  
ck to pick-up points such as the railway  
ing at Burketon, below. There they are graded  
l loaded into box cars for export around  
world.

them. Evening grosbeaks feast on the  
en goodies of winter-tight buds.

wflies, travelling eastward each year,  
use widespread defoliation. Shoot moths  
o ravage the foliage. Pale weevils,  
ntering in green-cut stumps, emerge  
do their thing.

t that's not all. Loads of sleet and ice in  
ly spring break the branches. Brush and  
eds growing between the rows com-  
e for moisture, food and sunlight. Light-  
g kindles fires, as do careless smokers,  
d snowmobiles are the latest scourge,  
naging snow-covered seedlings.

ork at a well-tended Christmas tree  
ntation is a year-round job. It starts  
en full winter sets in as lot owners battle  
rodents. Spring brings planting time,  
n spraying to keep down insect pests.

e trees are trimmed for shape in summer  
l just before autumn cutting sprayed  
in, this time with a green chemical  
improve their appearance. The chemical  
nufacturers also claim that the spray  
fire-repellent qualities.

m mid-October on, the trees are cut  
chain or hand saw and baled for com-  
tness with twine or plastic netting  
ractor-drawn binding machines.  
ding and trucking finish the job, but  
the year's work. The stumps must  
sprayed to discourage wintering pests  
to kill lone bottom branches that  
uld flare up into useless, unsightly  
ches' brooms.

ether a person cuts his own tree at a  
station, selects one from a city lot or  
phases a tree at the door, heeding  
following points should lead to satis-  
on.

measure the room height before buying.  
utting the butt at home to shorten a  
e reduces quality and destroys the  
aracter of the tree. Smaller trees are  
eaper, anyway.

urchase the tree early when selection  
best.

mpare quality and price at several  
s.

ask the salesman to identify the species.  
otch pine has two needles in a cluster,  
o inches long. White spruce, a single,



four-sided needle,  $\frac{3}{4}$  ins. long that will  
roll between thumb and finger. Balsam  
has a flat,  $\frac{3}{4}$ -inch needle.

- Make sure that the tree has a butt that will fit into the tree stand, long enough but not too large.
- Check the trunk for any sweep or crook that will make mounting difficult. Each tree should have a straight, single stem.
- Foliage should be fresh and clean. Bending or crushing the needles for moisture content will show up the dry, brittle needles.
- Store the tree outside until it's time to decorate.
- Mount the tree in a stand that will hold water. It will use half a pint of water a day through evaporation. If water is faithfully replenished, the tree will remain fresh for almost three weeks.

Studies show that a fresh green tree, adequately watered, will retain sufficient moisture in the foliage to make ignition by matches impossible. Smoking in the home is a far greater hazard, according to statistics.

An unwatered spruce dries rapidly and soon all that's left is the skeleton and a pile of needles on the carpet. Scotch pine and balsam, although they may turn brown from lack of water, usually last for weeks before the needles fall.

All electrical equipment should be checked to ensure that it is safe. If in doubt, call the fire department or the local electrical utility.

Of course, all this fuss and bother can be avoided by buying an artificial tree. Manufacturers of these trees say that sales are

growing because of the ban on real trees imposed by many apartment managers.

Consisting of polyvinyl or tinsel needles on wire branches inserted into holes in a trunk, the instant Christmas tree, sans its woodsy smell, appears to be used for three years. After that, the sentimentalist often reverts to the real thing.

Although the Romans decorated homes and temples with evergreens during their mid-winter Saturnalia, the Christmas tree custom as we know it probably started during the Protestant Reformation. Martin Luther, struck by the natural beauty of a small fir and its snowy branches, took the tree home to his children. He simulated the star glitter by attaching small candles to the branches.

The ritual of decorating the tree with glass baubles was made popular by Prince Albert, Queen Victoria's consort, at Windsor Castle in 1841. The royal custom quickly spread to both stately homes and cottages throughout Britain and was brought to colonial Canada by British immigrants. The German Lutherans in Pennsylvania had already introduced Martin Luther's tree to the United States.

Today, millions of trees are going up in millions of homes to the delight of toddlers and adults alike. But perhaps the Christmas tree's greatest contribution is its symbolic value. Somehow it succeeds in uniting all men of the Christian world — if only for one day of the year! □



# along hydro lines

## New pollution drive

Ontario Hydro has contributed \$140,000 to a four-year research program aimed at developing a system for the removal of sulphur dioxide from chimney effluents at thermal-electric power plants.

Fifteen US electrical utilities are also backing the \$6¼ million, three-phase study by Babcock-Wilcox and Esso Research and Engineering. The companies are working jointly on a system to recover sulphur dioxide emissions either as sulphuric acid or elemental sulphur.

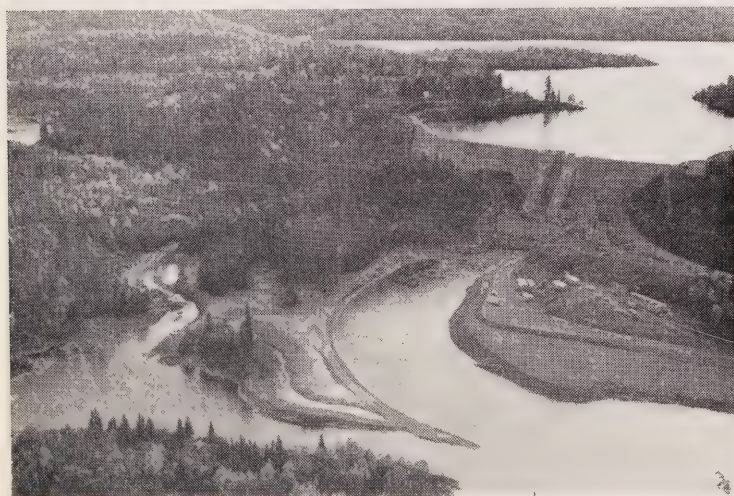
The move by Hydro is part of an intensive anti-pollution campaign. In its drive to clean up the environment, Hydro has set aside \$1.5 million for a five-year study of thermal plant stack gases by its own research team. In addition, the commission has spent \$40 million to date on anti-pollution equipment for its thermal-electric plants. □

## New plant

A new power station came into service in October at one of the few remaining hydro-electric sites in Ontario capable of economic development.

Aubrey Falls generating station, located 45 miles northwest of Elliot Lake on the Mississagi River, has a capacity of 130,200 kilowatts. Going full out, it could supply the combined peak needs of North Bay and Sudbury. The station was built at a cost of \$32.6 million and has two units.

Aubrey Falls is located three-quarters of a mile upstream from



One of the few

the falls of the same name so it does not interfere with their beauty. By agreement with the Ontario Department of Lands and Forests, Ontario Hydro allows water over the falls during the daylight hours of the tourist season. A road into the falls passes the main dam and the six-and-a-half-mile lake created by it.

Two more hydro-electric stations are under construction at the falls. Ontario Hydro harnesses the province's rivers wherever economic. Due for completion next year, Wells generating station is located about 30 miles downstream from Aubrey Falls and will have a 203,300 kilowatt capacity. Lower Notch, a slightly larger generating station on the Montreal River near Cobalt, will come on line a year later.

## Going up

Ontario Hydro last month announced a \$50 million bond issue at an unprecedented interest rate of 8½ per cent. The issue consists of five-year non-callable and 25-year callable securities.

Inflationary pressures have resulted in increasingly high interest rates in the money market since World War II. Rates on Hydro bonds have risen to their present level from two per cent in the 1940s and five per cent in the 1950s (see page 9).

## Don't pull the plug



Sink or swim

Keeping water outside rather than inside a bathtub may have certain advantages, as this particular model proves. It was originally built by a Toronto advertising agency for an Ontario Hydro TV commercial. Then Lew Clemens, who lives in Toronto, borrowed the "boat" for a paddle across Lake Ontario. He and some friends accomplished the feat, paddling from Port Dalhousie to the CNE in Toronto in 28 hours. Object of the trip was to bring the pollution of Lake Ontario to the public's attention.

Mr. Clemens and one of his crew, Tim Laing of Welland, were seen taking two ladies for a joy ride.

## Seeing eye to eye

The Ontario Municipal Electric Association, in a letter to the chairman of a provincial standing committee on government commissions, has defended the recently announced increase in wholesale rates Ontario Hydro charges for power supplied to municipal utilities. The increase, averaging six per cent, goes into effect on January 1.

Dr. R. H. Hay, of Kingston, chairman of the OMEA's Provincial Costing Committee, contended that growing demands for electrical energy have required substantial spending on additional



rating facilities. Since Ontario Hydro is bound by statute to produce power at cost, there is no profit buffer to absorb the leasing costs.

Prudent financing has dictated the establishment of certain utilization reserve funds so that extraordinary events with unusual charges would not upset the stability of the rate structure," he said. But in this particular case it would be futile to use a fund to lower or wipe out the increase. Inflation and other continuing factors should be reflected in the cost of power from year to year. □

## municipal briefs

**Am Thuell** probably didn't realize what he was getting into when he went to work at the steam-electric plant in 1919. Now 73, Mr. Thuell is still running the Blyth Hydro system as manager. During the last half-century, he's also continued to operate his own electrical contracting business. To mark the 50-year occasion, he was presented with a certificate by AMEU local Gus Boussey, of Clinton.

**W. Houtby**, former manager and secretary-treasurer of Welland Hydro, died in October. He had retired in 1964 after 38 years with the utility. At that time, the local commission named a substation on Smith Street in his honor. Born in St. Catharines, Mr. Houtby moved to Welland 50 years ago and became deeply involved in the affairs of his adopted community. He was a member of the Board of Education for over 10 years, a member of the Welland District Scout Association and president of the Welland District Council of Boy Scouts of Canada in 1949. From 1957 to 1961, he served on the Welland Local Employment Committee and was past master of Copestone Masonic Lodge and past district master of Niagara District B. He was an elder of Central United Church.

**Port Arthur PUC** will soon be stepping into the computer age. The commission approved the move after recommendations by manager Bruce Annand. They follow a four-month feasibility study. The commission also authorized management to enter into negotiations to provide time-sharing with any other organizations. Training programs on data processing are already underway. **More staff** appointments have been made by the Thunder Bay Hydro commission. They will take effect January 1 along with the new municipality created by the joining of Fort William, Port Arthur and parts of adjoining townships under the province's regional government plan. John C. Gilmore, now assistant manager of Port Arthur PUC, will be chief engineer. **Il Ounpuu**, at present manager of Fort William Hydro, will become operations manager of the new utility. Mr. Gilmore graduated from the University of Manitoba in 1949 and joined the Port Arthur utility in 1954 as an electrical engineer. Mr. Ounpuu graduated in 1959 from the University of British Columbia, joining the Welland Hydro four years later.

**For the road** could have been the theme of Ingersoll PUC's 10th annual Cheese and Wine Festival. The utility provided 800 cups of free coffee for the wine-tasting session. □

## ion station

Canada's largest electric generator whirled into action last month on the banks of the St. Clair River, 14 miles south of Sarnia. More than 300 dignitaries from both sides of the Canada-US border gathered at Ontario Hydro's \$239 million Lambton generating station as Prime Minister John P. Robarts started up the first 500,000-kilowatt units at the new plant.

A second unit is also producing power and the two remaining generators are scheduled to come on line next year.

Ontario Hydro Chairman George Gathercole helped the Prime Minister bring the big machine on line.

The official opening, which included the unveiling of a commemorative inscription dedicating Lambton generating station "to the people of Ontario," signified the dawn of a new era in power generation by a Canadian utility.

Until start-up of the Lambton station, Ontario Hydro's largest generators were the 300,000-kilowatt units at Lakeview generating station, on the western outskirts of Metro Toronto.

"Two million kilowatts (Lambton's ultimate capacity) is sufficient to meet the electrical requirements of approximately 1.3 million homes," said Mr. Robarts, "or the combined peak requirements of Sarnia, Chatham, Windsor, London, Hamilton, St. Catharines, Oakville, Kingston, Ottawa, Barrie, North Bay, Sud-



*Meet the machine . . . meet the men*



bury, Thunder Bay, Niagara Falls and still have a few kilowatts left to spare. Or, to put it another way, it is more than enough electricity to meet double Newfoundland's current power demands."

Mr. Robarts and Mr. Gathercole toured the plant on a golf cart. At one point, they watched George Estey, far right, Lambton construction manager, balance a coin on the running 500,000-kilowatt unit. The touring party is seen meeting plant employees during another stop. □

## Task force

The Northeast Power Co-Ordinating Council (NPCC) is establishing a task force on "environmental matters" to delve into pollution and aesthetic problems associated with the production and transmission of electrical energy.

An association of 22 major electrical utilities — 21 of them American — NPCC was formed after the widespread outages in



Ontario and the US eastern seaboard on November 9, 1965. Ontario Hydro is the Canadian representative.

The task force will probe the utilities' role in control of air and water pollution, siting of generating stations – both thermal and hydraulic – and the location of transmission lines. NPCC Chairman Ernest R. Acker says the need to reconcile the public need for an adequate, reliable power supply with the public need for a clean and attractive environment is "one of the most pressing concerns facing the electric power industry today." □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

It's an old story to most hydro utilities. A cat perched on a utility pole and no one able to coax it down. Within the same week this fall, two utilities were involved in cat calls, but there the similarity ends.

When two children in Ingersoll told their mother about a poled cat, she assured them that the animal would probably descend on its own. However, the cat showed no sign of moving and the mother decided to seek help. The fire department said they did not rescue cats from trees or poles. The police department also declined to take action.

More determined than ever, the woman contacted Ingersoll PUC. Within five minutes, according to the Ingersoll Tribune, a hydro truck arrived and retrieved the cat. And the PUC earned a commendation from the newspaper for being "so humanitarian".

The same week, in Burlington, a cat spent three days up a PUC pole. The utility had been contacted, but was unable to get a bucket truck into the backyard where the pole was located. They repeatedly cautioned people not to try to rescue the cat.

Finally, someone used an aluminum ladder to climb the pole. He received an 8,000-volt jolt and fell 30 feet. He survived, but the cat was killed. The incident was reported in the Hamilton Spectator.

There is one central message in both stories. The only people who should attempt to rescue pets from hydro poles are professionals trained for the job.

Public safety is high on the list of community relations activities being undertaken by Windsor Utilities Commission. Working in co-operation with public schools, the utility is using a portable display to show students what happens when you meet electricity head-on.

Typical electrical accidents are demonstrated with miniature



What's his line?

poles, ladders, and victims who literally light up when the contact live wires or equipment.

The demonstrators include an official from the utility and a lineman dressed in typical working gear. The utility plans to present this dramatic safety message to all senior public school students in Windsor this winter.

Strathroy PUC, along with several other utilities, is entering into a central computer billing system with London PUC. As of January 1, the London-based computer will calculate and prepare all Strathroy's residential customer accounts. In itself, this is a good example of sharing modern equipment to obtain greater efficiency and lower costs.

But Strathroy used a novel approach to inform its customers of the forward step. In an advertisement in the Strathroy Age-Dispatch, the PUC used computer-style typeface, spacing, and layout to announce the change and explain the temporary inconvenience that may occur.

In visual as in verbal communications, the way you communicate often has as much impact as what you say.

## Out of sight

Going about a job quietly and effectively didn't go unnoticed in the nation's capital.

In this case, the subject was Ottawa Hydro and the observation came on the editorial page of the "Ottawa Journal." The newspaper was commenting on the utility's continuing program of replacing overhead lines with underground cable in the city core.

Said the newspaper: "Recent work on Queen, Bank, O'Connor and Metcalfe Streets is the largest segment of a project to replace downtown overhead wires with underground cables. Though the idea isn't new (the first Ottawa Hydro cable from Chaudière generating plant to a sub-station on Slater was laid in 1911), Ottawa Hydro has in recent years spent about \$1,000,000 a year on this work. Eventually, all overhead wires in the area bounded by Wellington, Elgin, Laurier and Bronson will disappear."

The paper pointed out that underground cables were a necessity from the point of view of both aesthetics and service in an area where high-rise buildings were going up. In the early 60s, there was a plan to do the job in five years. However, economic conditions dictated that the job be done gradually.

"But the contribution it will make to the beauty of our city is easily recognized by a stroll down many centre streets, looking up at an unlined sky instead of an unsightly maze of poles and wires. Hydro will further please us all by completing this work as quickly as is economically possible."

## Over enthusiastic

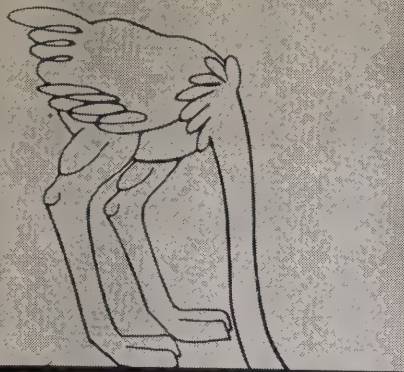
Acceptance by the public of the recently opened Ontario Science Centre on Don Mills Road, Toronto, is encouraging to say the least. As many as 20,000 persons have visited the multi-level structure on weekends.

The vigorous – and sometimes violent – enthusiasm of youngsters has already taken its toll. Push buttons are particularly vulnerable and are now being countersunk so they can't be pushed with an open palm. Other casualties included stationary bicycles. These had to be re-welded and strengthened so the kids could continue to generate power to turn on lights and produce music.

The bikes are not part of the Hydro exhibit, which has fared better than some other areas of the centre – perhaps because of experience gained in participation displays at the Canadian National Exhibition.

Mel Pattison, chief of production at the Science Centre, observed: "It's all part of the growing pains of a new organization."





## as don wright sees it

path as we are to make the suggestion, it now appears as if Mike Faraday, Tom Edison and Al Volta were a few thousand years too late with their contributions to electrical science. Evidence is turned up to the effect that the Egyptians may have been aided in the delicate task of wrapping King Tut for posterity by high-level fluorescent lighting utilizing 60-cycle power provided by nuclear-electric plants of advanced sign.

According to the Society for the Investigation of the Unexplained, an august body of university culty members from across the United States, a puzzling and provocative wall painting found in a temple at Dendra, Egypt, shows two priestly figures carrying huge bulb-shaped objects complete with what appears to be filaments, capacitors and electric cable.

The society's journal describes the objects as looking "astonishingly like enormous lightbulbs" resting on pedestals resembling insulators for very high tension power lines."

To reinforce its theory that a sophisticated electrical technology may have existed in prehistoric times, the journal cites the existence of ancient paintings found on ceramics in South America which appear, after detailed analysis by competent experts, to be formalized layouts for electronic circuitry.

And a Russian astro-physicist draws attention to certain mysterious glass-like stones which have been found in various parts of the world containing radioactive isotopes of aluminum and yttrium. He speculates that these may be the remains of nuclear tests carried out before the dawn of recorded time — even before this column first took pen to papyrus.

So, the skeptic is sure to ask what became of art and why haven't we found more evidence in the form of rusty screwdrivers and the ruins of generating stations? The answer may come from the moon.

After examining material collected by the astronauts, some scientists contend that the moon's surface is composed of material very similar to the ash produced by the burning of coal at a modern generating plant. Aside from constituting a serious setback to the green cheese line of reasoning, this theory opens the way for all sorts of conjecture.

Some are already advancing the suggestion

that the moon was indeed inhabited at one time but its people fell victim to a technological deficiency. Skilled in the construction of giant generating plants, the little green people never did learn how to extract 99.9 per cent of the particulate matter from the plumes of the stacks. Things went from bad to worse until the whole shebang foundered in its own fly ash.

No doubt the truth will eventually out, but in many ways we would prefer to leave the laurels with Edison and forget about the moon and the mummies. Much of the mystery associated with the building of the pyramids would be bound to evaporate if we ever found out they were built with the aid of gantry cranes and electric hoists. Likewise with Cleopatra and other swingers of the day. We refuse to envision them barging down the Nile to the twang of an electric guitar.

On the subject of space travel and electric guitars, we might mention that two audiologists in Michigan have been spending their time measuring the intensity of sound emitted by rock bands. They conclude that a typical group of long-hairs blasting off with the aid of electronic amplifiers generates the noise equivalent of a Saturn rocket at take-off.

Not too reassuring in itself, perhaps, the findings do offer a more logical explanation for the trend by young males to cover their ears under a mass of hair. Self-protection, man. Self-protection.

■ Socialized medicine is making great strides in this country but we have a lot of catching up to do. In Yugoslavia, for example, it's been announced that women will be able to obtain falsies, wigs and other such paraphernalia under the national health service plan.

Somewhere along the line, though, we're going to have to pull in our horns in the matter of spare parts for females. Some guy is going to blow his mind watching his wife stowing her assets away in the bureau drawer. At the end of a hard day who wants to make decisions — like whether to sleep with what's left or curl up in the drawer?

■ On the other hand, a full head of hair can be dangerous. Take that poor chap from Malaysia who had to be treated in hospital for a sprained neck after a monkey mistook his head for a coconut. The fellow was passing a palm tree when a trained monkey, sent up the tree by its owner to pluck coconuts, jumped on his shoulders and twisted his head.

It's all very interesting, no doubt, but also comforting to us skinheads. Any member of the bald-pated set could have passed that monkey with complete impunity — assuming, of course, that Malaysian anthropoids have never been trained in the harvesting of egg plants and honey melons.

We'll add squash to the list purely as an excuse to unload a fascinating tidbit which has been going to seed in the murky depths of our "future issue" file for the last three years. "Did you know," the item asks, "that there is no force more powerful than a growing squash?"

Some nut apparently harnessed an 18-day-old squash in such a way that, in its growing process, it lifted 50 pounds on a lever. Three weeks later it lifted 5,000 pounds. Not content with this revelation, the scientist in question went on to prove that turnip seeds in rich soil can increase their weight 15,000 times in a day.

And with that out of the way, we can face the

new year with greater composure. It was getting so we hated to open the file knowing full well that the squash and turnip seeds were for ever ready to leap out and commence growing all over the place.

■ Last-minute shoppers might like to consider a bagful of kilowatt-hours for the man who has everything. Last year a customer of Northern States Power Company gave her husband a gift certificate good for \$50 worth of electricity. Thought to be the first such certificate ever issued in the United States, some believe it might start a new trend in gift-giving.

With such a \$50 gift certificate, the average residential customer in urban Ontario could buy 4,200 kilowatt-hours of electricity. This is enough to keep 24 bottles of beer cool for almost four years with room left over in the refrigerator for less essential commodities such as bread, milk, butter and meat.

Gift selection can be a real problem, though, and we would like to offer a few suggestions of an electrical nature for the desperation shopper.

For the executive, you might consider the electronic VIP desk upon which he can stand the Playmate calendar he is almost certain to receive from his wife. This outfit comes with a UHF and VHF television receiver, a TV camera control, a portable AC-DC tape recorder, an AM-FM radio, an electric clock, high-intensity lamp and several AC outlets. It sells for \$1,295 and offers a big advantage over the ordinary desk in that it provides no clear surface upon which one might be expected to work.

A can or two of electric heat in an off-white or elephant pink makes another novel offering. Developed in Britain, this silicate paint can be sprayed or brushed on the walls in the normal manner. Hooked up to a 40-volt supply, the entire wall becomes a heating element and the manufacturer swears there is no danger from shock.

Electric power tools are always popular and if a gift of this sort is intended for a teen-age boy, it would be a nice gesture to include a hairnet. Safety officers are urging that this precaution be taken in the light of changing hairstyles.

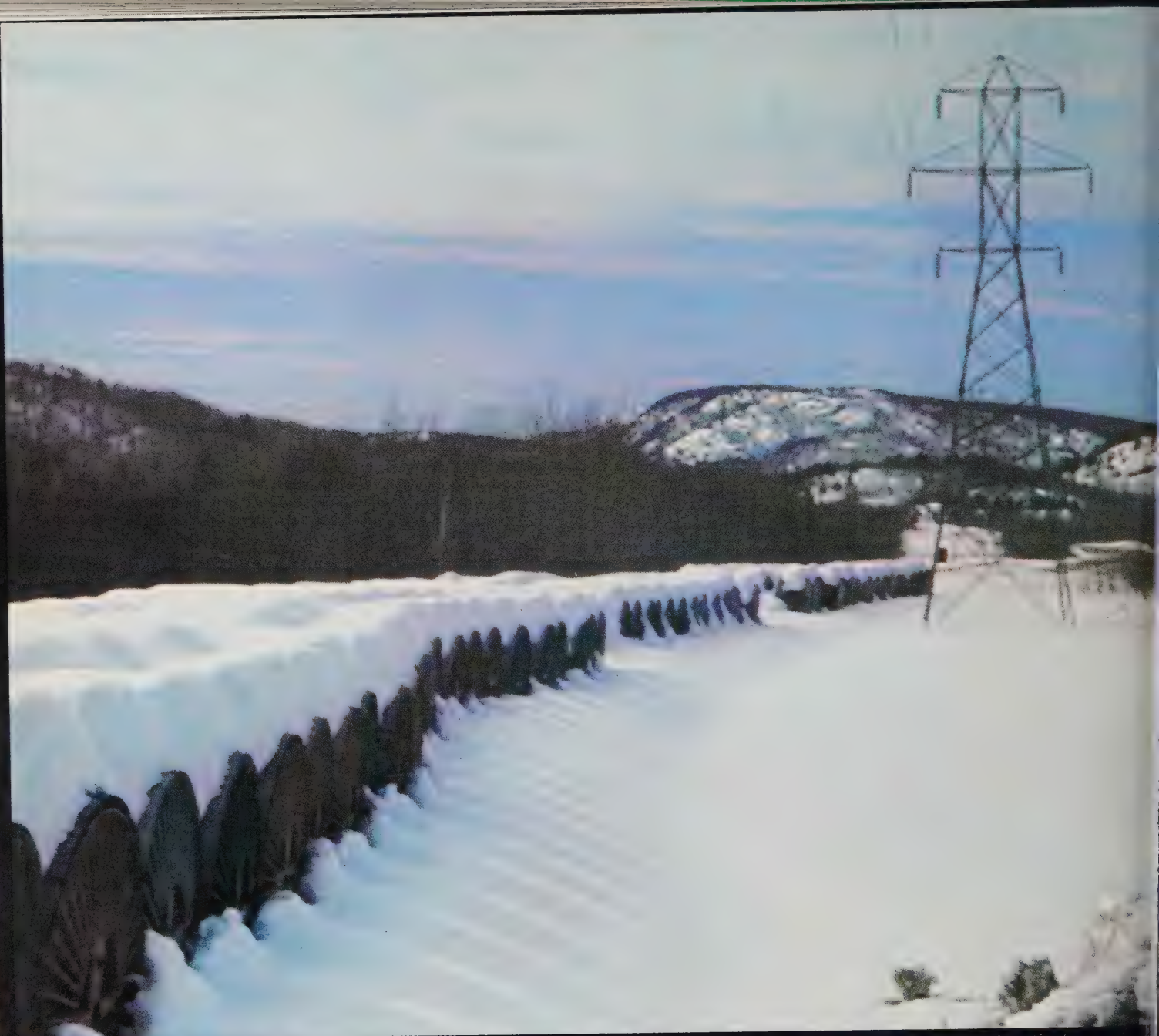
And for people with children who are still wet behind the ears and elsewhere, there is an ingenious little electronic sensing package available which sounds an alarm when the moisture content of the bed sheets suddenly starts to rise. It's described as "a highly useful adjunct in the treatment of children with nocturnal enuresis — or bed-wetting.

Finally pet-lovers may be interested in a new electric mattress designed for sick animals. Made of fibreglass with a built-in electronic thermostat, this item is fire, water and vermin proof. Its quality has been attested to by the inhabitants of the ape house at the Manchester zoo where it has been tested extensively.

And so — with a hearty ho, ho, ho — we'll wish you all a Merry Christmas and a Happy New Year. But do go easy on the ho, ho, hos. You don't get very many under .08!







# 1970

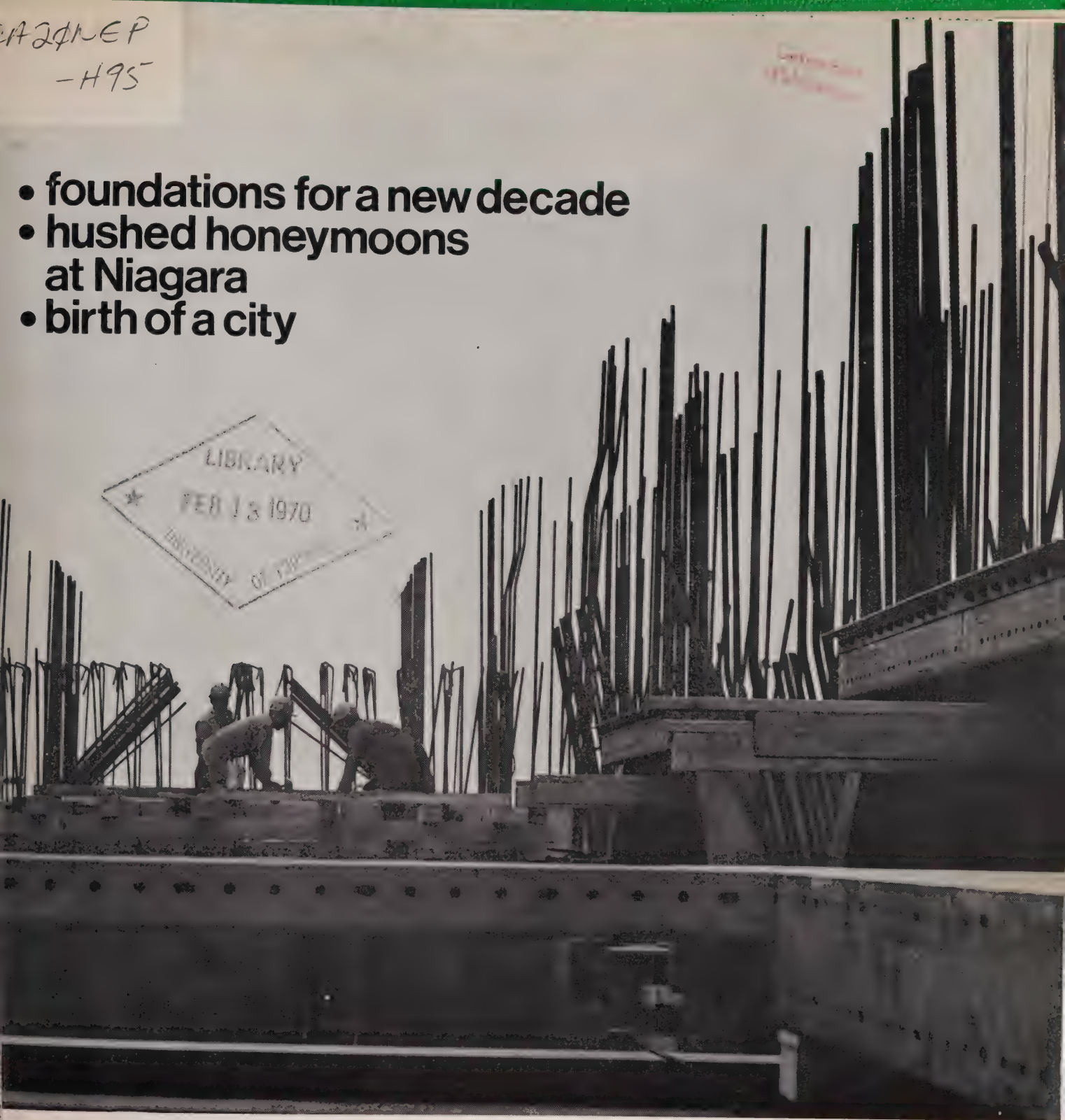
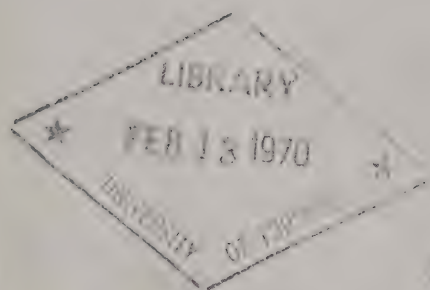
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- foundations for a new decade
- hushed honeymoons  
at Niagara
- birth of a city



**ontario hydro news**  
january/1970





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### the cover

Like trees in a petrified forest, reinforcing rods rear starkly into the air at Nanticoke power station, one of the giant coal-burning plants of the seventies. Nanticoke, under construction on the Lake Erie shoreline, is due to produce first power next year.

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## Viewpoint

# public enemy No. 1

At the outset of a new decade, it might be timely to ask ourselves whether or not the spirit of negativism which has been on the ascendency in the 1960s shouldn't be declared public enemy number one.

Protest and criticism are only valuable up to the point where they stimulate reform and initiate improvement. As an end in themselves they can destroy confidence and stifle initiative.

While we must remain flexible in our thinking and continue to question all points of view, it will be unfortunate if we come to equate intelligence and liberal-mindedness with alarmism and the purveyance of doom.

Pessimism is short-sightedness, in our opinion, and while the disease is contagious, people associated with the electrical industry should be especially immune. The future belongs to our form of energy and we must not allow our immediate problems to grow so tall as to obscure the glowing horizon.

Air pollution is a case in point. The present use of fossil fuels for generation makes us one of the many contributors. Paradoxically, electric energy holds out the greatest hope for a cleaner tomorrow for all of us.

More effective and economically feasible pollution control devices for fossil-fueled plants are almost certain to be with us soon. And the transition from this type of generation to nuclear is bound to accelerate. Both developments open up prospects of the greatest significance for an improved environment.

It is realistic to envision enormous and virtually pollution-free central generating stations supplying millions of homes and apartments utilizing electricity for heating, cooling, lighting, laundering — completely free of smoke, odor and all forms of air pollution.

Electricity holds out a similar promise to industry. All-electric factories will be welcomed in any community.

Transportation is a third major source of air pollution and here again electricity offers the key to abatement.

In the area of mass transportation, high-speed electric trains are ideally suited for inter-urban travel while electrified buses and subways add nothing to big city smog. The same can be said for electric cars and trucks.

It is not too visionary to predict that the combustion of fossil fuels of any nature will be unknown in the great urban centres of the future. Instead, they will be utilized more efficiently by the chemical industries as the basis for new and improved materials and products.

Society will be more and more dependent upon electricity. Technically we will be competent to meet the challenge. But we must also rise to the occasion in terms of integrity and salesmanship.

We must be sure at every step that our procedures and objectives are compatible with the wider public welfare. Every effort must be made to gain public understanding and support. Convinced that we have a vital stake in proceeding with electrical development only at the minimum cost to the environment, the public will accept compromise.

We are not, after all, a sinister splinter group which has escaped from the enlightened mainstream of society and is willing to plunge everyone into oblivion in a mindless search for an electrical Valhalla.

Our goals are the public's goals. We all breathe the same air, use the same water and share the same environment. We must all take every care of this precious earth in order to realize the promise of cleaner and brighter tomorrow. □



# lawn of the seventies

**Hydro News:** What sort of a year was 1969?

**Gathercole:** Eventful, to say the least. During the 12 months we had to weather many adversities as a strike, continuing inflation, technological teething and changing social attitudes. We weren't an island though — utilities right across North America experienced similar pressures. But in the face of this, for the first time in history, our peak exceeded 10 million kilowatts while our capacity to meet demands went over the 11 million-kilowatt mark. I think this attests to the durability of our organization and the dedication of its people.

Altogether, we brought on line about 100,000 kilowatts of extra capacity last year. By far the largest portion of this was accounted for by the first two 500,000-kilowatt units at Lambton generating station near Sarnia. The Prime Minister of Ontario officially opened the station in November. The other two units, of the same size, are scheduled for service this year. Water power contributed another 100,000 kilowatts with the extension of the Hartsville station on the Madawaska River in Eastern Ontario and the opening of Aubrey Falls station on the Mississagi River in Northern Ontario.

**Hydro News:** What were the adverse conditions you mentioned?

**Gathercole:** We're caught up in the inflationary spiral with rising interest rates, equipment and material costs and larger envelopes. Other factors are the late delivery of vital equipment from manufacturers and the unavoidable problems of new technology.

**Hydro News:** Obviously, interest rates on borrowed capital are high on your list of inflationary bogies. What is the outlook for the bond market?

**Gathercole:** Well, investors in fixed-interest securities are insisting on much higher interest yields as protection against the

upward march of wages, costs and prices. It is recognized that bond yields will continue to be high until the upward thrust of these forces can be arrested. However, in spite of the popularity of equities with their combination of dividends plus a chance of an increase in the value of the stock, I feel that bonds will return to favor. With the idea of tapping all available money markets, we went outside North America for funds last year for the first time. We feel that the loan — we borrowed \$40 million in West Germany at a lower rate than prevailed here — is a good one. There's only so much money available in Canada and scarcity of money, just like any other commodity, tends to force up the price. By going to Europe we eased the pressure on the money market here. We frequently need to expand in spite of the tight money climate, so when we can borrow at a lower rate it's a plus factor in keeping down the cost of power.

**Hydro News:** What do you foresee in 1970 for the Canadian economy in general?

**Gathercole:** While it's difficult to make predictions, it would be regrettable if we experienced the paradox of sharply rising wages during a period of increasing unemployment together with higher prices and a slowdown of the economy.

One cause of inflation is that the magnitude of wage increases has outstripped any possible increase in industrial productivity. This is general, but is particularly noticeable in the construction trades. The effects of this process are filtering through ever more strongly, thrusting up costs as seldom before in time of peace.

Somehow we have to maintain confidence in the Canadian economy and overcome the inflationary psychology in which business is reluctant to curtail capital projects today for fear they will cost even more tomorrow. I think one of the answers is for industry to run a tighter, more efficient ship. A great deal of self-appraisal and internal examination is undoubtedly warranted if we are to lick inflation.

*In this interview with Ontario Hydro Chairman George Gathercole, writer Hal O'Neil examines some of the issues that will affect Hydro in the next decade.*



George Gathercole



In spite of a cooling of the economy this year, electrical utilities will be forced to maintain expansion if power resources are to catch up on the buoyant demand of the 1960s. Capital spending for Hydro will run in excess of \$500 million in 1970.

**Hydro News:** In view of what you've just said, what is the philosophy behind Hydro's active marketing program over the last few years?

**Gathercole:** While our resources are occasionally out at full stretch, our system has unused capacity part of each day, month and year. We're trying to fill in these gaps and achieve low kilowatt-hour costs by selling more power. As we increase our capacity to meet the peak, we want to develop other demands that provide balanced use of our facilities. Whether full capacity is required only a fraction of the time or all the time, a modern thermal-electric system still costs about the same to build. This is particularly true of our transmission and distribution network. It requires almost the same capital outlay whether it's carrying a flood or a trickle of kilowatts. Thus making maximum use of the system helps keep down per kilowatt-hour costs and rates. By developing loads and operating the system advantageously we benefit all our customers.

**Hydro News:** Just how effective are these load-building campaigns?

**Gathercole:** One illustration that comes to mind is that of the Tennessee Valley Authority, which with an annual average residential consumption of 13,600 kilowatt-hours of electricity dwarfs almost all other utilities in the United States. This is almost double what the average resident of Ontario consumes and more than twice the average for the United States. The importance of this from the customer's point of view is that largely through high consumption, TVA's rates are among the lowest in the world. Residential electric heating is one promotion that has really borne fruit. In 1958, the number of dwelling units heated electrically in Ontario could be counted on the fingers of one hand. Today, over 80,000 homes and apartment units are heated electrically. Our forecast calls for electric heating to be installed in one out of four new dwelling units this year.

**Hydro News:** Is a shotgun approach used in load-building or are there some loads which look more attractive than others?

*Linework and the spraying of rights-of-way to keep the ever encroaching bush at bay are continuing tasks. Two new generating stations came into service in 1969 — the 2,000,000-kilowatt thermal-electric plant at Lambton, near Sarnia, and the hydro-electric station at Aubrey Falls, on the Mississagi River.*



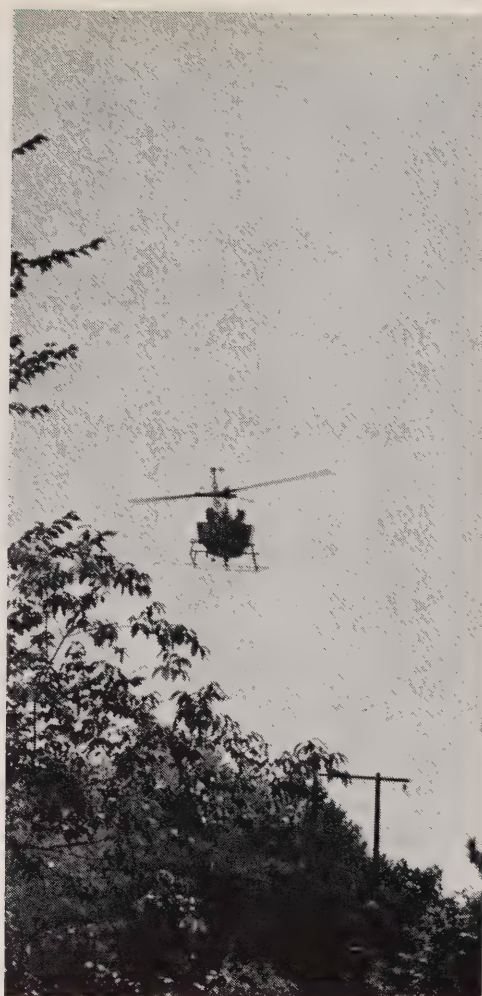
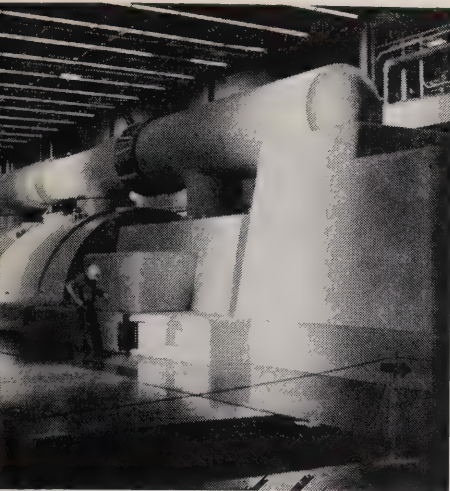
**Gathercole:** A good argument can be made for the premise that any additional load is a good load. But, if we can develop a load which works in reverse to the established peaks and valleys of demand, it would certainly be more attractive. Air-conditioning comes to mind in this context. Heavy demands would come in the summer months when we're in relatively good shape to provide power. Traditionally, our heaviest demands come in winter — with shorter daylight hours and colder weather. We're sometimes criticized for promoting electric heating because it is essentially a winter load. Our answer is that while the maximum demand for space heating occurs during the winter months, there is not an exact coincidence of its peak with that of the rest of the system. Much of the heating demand takes place during the night and early morning hours when the whole system, even in winter, is below full capacity. These heating demands extend over a seven or eight month period and are five or six times greater than other residential consumer demands. Thus electric heating makes greater

use of all our facilities and thereby makes an important contribution to the reduction of unit or per kilowatt-hour costs.

**Hydro News:** In many of these promotions, the municipal utilities are part with Ontario Hydro. How do they view about the recent six per cent increase in rates for energy supplied to them?

**Gathercole:** The commission meets regularly with officials of the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities to review trends in costs and to advise them on pending revisions in the wholesale power rates. As a result of these discussions with associations, which represent most of the commissioners and managers of Ontario's municipal systems, have accepted the view that power costs are rising. On a formal note, the Power Costing Commission of the OMEA supported the increase in rates. A letter to the legislature's standing committee on government boards and commis-





committee had been examining the  
d for the increase.

**Hydro News:** What were the reasons for  
increase?

**Gathercole:** Greatly increased operating  
expenses coupled with an unprecedented  
multi-billion dollar expansion program to  
guarantee adequate generating reserves.  
Locally, rising power costs and rates are a  
direct reflection of four major factors.  
These are the need for large coal-fired  
and nuclear power stations to complement  
energy available from hydro-electric sites;  
the introduction in these stations of new  
technology and prototype equipment;  
the changing social and environmental condi-  
tions, for example the need to spend more  
on air pollution control; finally, the infla-  
tionary spiral to which Hydro is no more  
immune than any other enterprise.

We are completing the development of  
new economical hydro-electric sites in On-  
tario and, therefore, are increasingly de-

pendent upon the highly sophisticated and  
temperamental equipment associated with  
thermal-electric generation. Accordingly, a  
large and costly reserve capacity is required  
to ensure reliability and continuity of serv-  
ice. The size of individual generating units  
has increased more than seven times since  
the 1950s, and nuclear power is another  
significant move in the same direction.

In the social sphere, our obligations to-  
ward providing continuous service are  
paramount because of the almost total  
dependence of industrial, commercial, rural  
and residential customers upon a reliable  
power supply. Modern life simply stops if  
the power goes off. And, as I mentioned,  
environmental factors — air quality control  
and the public attitude toward the con-  
struction of power lines and stations — add  
to the cost of doing business. We agree  
that protection of the environment is essen-  
tial, but our customers must realize that  
these requirements contribute to higher  
power costs.

Finally there is inflation, which has forced  
up wages, salaries, goods, materials, serv-

ices and property. For example, between  
1966 and 1970, bulk power costs per  
kilowatt produced by Hydro advanced from  
\$42.70 to \$52.45. Fuel accounted for \$3.98  
of the rise, operation and maintenance for  
\$1.14, administration for \$1.11 and prop-  
erty taxes for 12 cents. Hydro expects to  
pay out \$111.3 million in interest in 1970  
compared with a \$65.5 million outlay in  
1966.

**Hydro News:** Have changes in rates al-  
ways reflected the general movement of the  
economy? And is the upward trend in rates  
only happening in Ontario?

**Gathercole:** Power rates in the province  
have been stable for many years. Often,  
rate adjustments involved decreases at a  
time when the cost-of-living index was  
rising. But all the aforementioned factors  
have a habit of catching up on any organ-  
ization. We are no exception.

Increasing power costs are not unique to  
Ontario. Consolidated Edison, in New York,  
has applied for a rate increase of 15.3 per  
cent. Nearly all US utilities are seeking rate  
increases to cover their costs. I understand  
that Manitoba Hydro is expected to raise  
its rates as much as 10 or 11 per cent this  
year and Hydro-Quebec has announced  
an increase of 10 per cent.

**Hydro News:** Is there no other way of  
approaching the problem of rising costs  
without increasing rates?

**Gathercole:** By the very Act which created  
Ontario Hydro, we're committed to the  
concept of power at cost consistent with  
reliable service, so I can't see how we can  
consciously avoid reflecting costs through  
our rates.

Some have suggested we use our rate  
stabilization fund to offset rising operating  
costs. However, we must be in a strong  
financial position if we are to borrow the  
vast sums of money we need for capital  
expansion. In less than a decade the value  
of our physical assets, now \$4.1 billion,  
will have increased to about \$9 billion. We  
must have strong financial reserves to sup-  
port the heavy borrowings required to  
finance this program. The rate stabiliza-  
tion reserve, now something over \$200  
million, was set up as a cushion against  
short-term problems. Conditions like a de-  
cline in economic growth, low stream flows  
which would substantially affect the cost  
of power over the short haul, major dis-  
asters or breakdowns in equipment and  
fluctuations in exchange rates on money  
paid to service foreign debt. The fund is our  
insurance policy, to reinforce our credit



and borrowing position and to smooth out costs and provide a stable rate picture. With the size of individual generating units increasing, the cost of delays or breakdowns is magnified many times and it would seem that the fund will have to grow rather than diminish if it is to do the job for which it was established.

The fund was not meant to cope with long-term trends. Clearly, the long-term trend is toward higher costs for electricity although any future rate increases will be within reasonable limits. After all, our average residential rate is but 1.2c. per kilowatt-hour, exactly the same as it was in 1953, compared with the 2.12c. reported by "Business Week" as being the average prevailing residential rate in the U.S. In other words, the cost of electricity in Ontario to the average householder is about 60 per cent of that in the United States.

**Hydro News:** In view of the growing public concern about our environment, will you elaborate on air pollution?

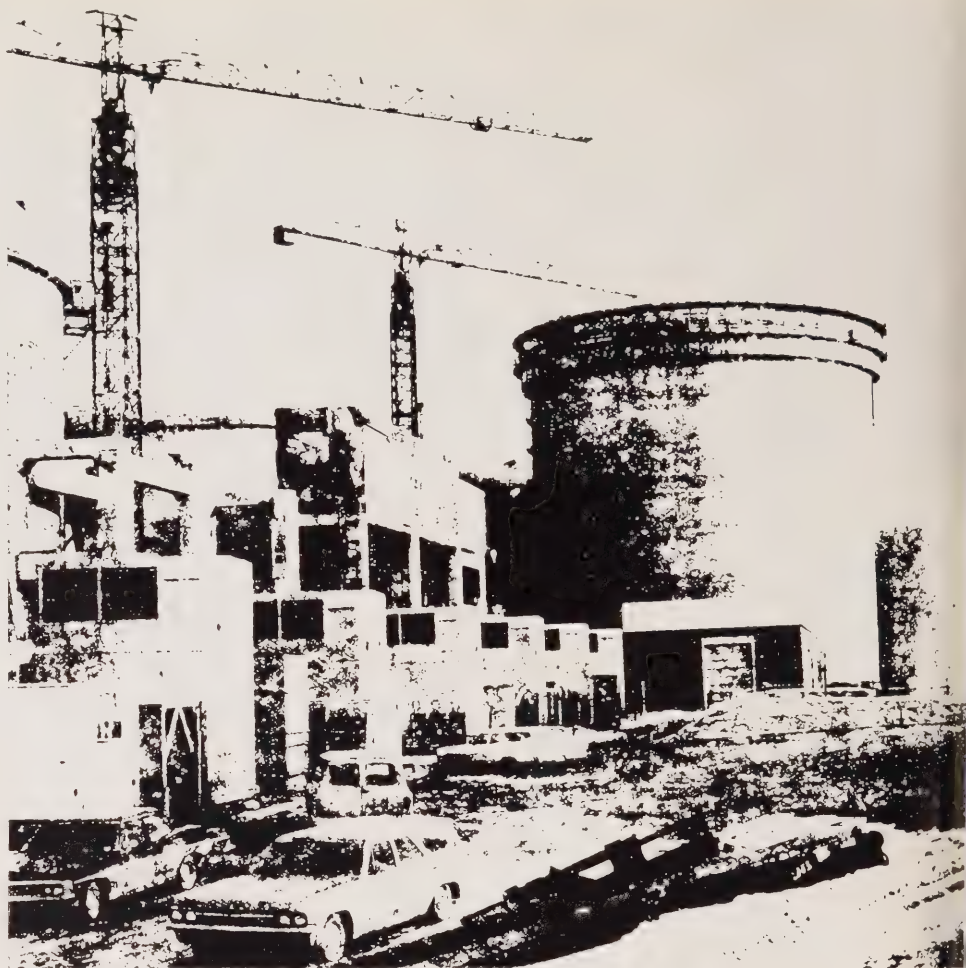
**Gathercole:** It's always disturbing to read and hear unfounded statements that Ontario Hydro is "irresponsible" and "acting in ignorance" over air pollution. We have specialists in pollution that are second to none and to date we've committed nearly \$40 million on precipitators, high chimneys and other hardware. Right now, we're planning a 700-foot stack for the Hearn generating station in Toronto which will bring pollution control expenditures at that station to nearly \$20 million, or about 12 per cent of the plant's capital cost.

**Hydro News:** It's true, isn't it, that high chimneys don't eradicate pollution, but merely spread it around?

**Gathercole:** It's a little more complicated than that. The basic measure of pollution is concentration at ground level where people live and a high stack does effectively disperse or dilute waste gases. Perhaps a good comparison would be the relative brackishness of dissolving a tablespoon of salt in a glass of water as opposed to a barrel of water.

In addition, sulphur dioxide neither remains in the atmosphere nor eventually comes down to the ground in the same form or quantity in which it was originally emitted from the chimney. It is measurably weakened and changed by the combined influences of weather and dilution. Some studies indicate that the average half-life of sulphur dioxide in the atmosphere is one hour and that the entire life cycle could be

Work continues around the clock on the vast nuclear plant at Pickering, east of Toronto. The efforts of about 3,000 people are now focussed on obtaining first power from the station late 1977.



as little as a few days. On the other hand, we've still a lot to learn about atmospheric pollution and a great deal of research is in progress.

**Hydro News:** Sulphur dioxide is one of the chief contaminants released by coal and oil-burning power stations. If it's the hazard to health and property that some people claim, why not switch to natural gas or why not introduce some process to extract the sulphur from these exhaust gases?

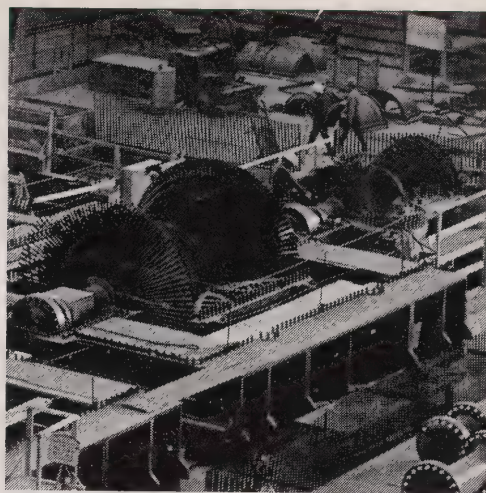
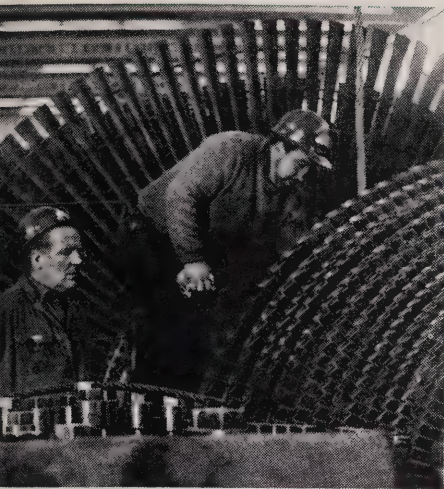
**Gathercole:** Natural gas is not available to us in the prodigious quantities we require. It is not commercially practicable to get a firm commitment from the natural gas utilities for even the quantities of fuel the Hearn station alone would require. Another point about natural gas is that while sulphur dioxide is not a problem, its combustion does release oxides of nitrogen. So there is still a pollution problem. As it is, the coal we use has the lowest sulphur content available on a long-term

basis. In the case of Hearn, special stocks of coal even lower in sulphur content — per cent — have been purchased at a premium and are stockpiled for burn under unfavorable weather conditions such as a temperature inversion over the city.

To answer the second part of your question, we look at any promising method of removing sulphur dioxide from flue gas. We have also assisted individuals and organizations in research projects other than our own. Just over a month ago we joined with 15 US electrical utilities to back development of an economical system to recover sulphur dioxide from waste gas and transform it into a useful by-product. The four-year, \$6.75 million program is being conducted by Babcock-Wilcox in association with Esso Research and Engineering. In addition, we've set aside \$10 million for a five-year study by our research division into stack emissions.

While some pilot schemes look hopeful, none has yet been demonstrated to be efficient on a large scale. One catalytic oxidation system does show promise.





ould add considerably to a station's total costs. And even this method is still in the developmental stage. It hasn't yet been proven to be feasible on a commercial-generating station.

is particularly significant that in a highly industrialized nation like Britain, the Central Electricity Generating Board has no plans for installing equipment to remove sulphur dioxide or other gases at large power stations. Like the rest of us, Britain is relying on tall chimneys to combat pollution.

I might be forgiven for going on at length, but we don't deny that Hydro contributes to air pollution, but so do many others. We are only one of countless offenders and we are trying to do something about it. What we have done is in the name of practical reality — adopting the best options available. Much has already been done. Major advances in equipment have been made and we have installed this equipment. Much still remains to be done. In the future, more effective commercially viable methods for removing impurities

from stack emissions will be developed. Ontario Hydro is co-operating to this end, but the solution requires action not only on the part of Hydro but across the broadest possible front involving industrial and residential development, automobile use and other long-standing customs such as the burning of leaves and refuse.

**Hydro News:** Another area of social sensitivity is the acquisition of property both for new generating stations and transmission lines. Why has it become sensitive?

**Gathercole:** With the number of property transactions now running around 8,000 a year, we are exposing ourselves about 150 times a week to possible criticism. Some cases are bound to hit the headlines, particularly in an age when the pressures on land make real estate such a valued commodity.

We can no longer pursue negotiations with owners and local authorities free from the glare of publicity, but this is not neces-

sarily a bad thing. At least the fact that we continue to do business in good faith and that we continue to offer fair prices will not go unnoticed.

**Hydro News:** It's not just the fact that Hydro is acquiring land, is it?

**Gathercole:** No. People are also concerned about the way the land is being used. Within the next four years, Hydro must acquire 50,000 acres for transmission line rights-of-way. These are needed to bring power from new generating stations into urban centres.

Incidentally, we've just launched a program of research into transmission line design. We hope to achieve not only lines that are aesthetically pleasing but ones that will also save us money. For example, if we can design a tower that will permit us to replace a 115,000-volt line with one twice that capacity on the same right-of-way, one-third to half the cost of a new line would be saved.

A completely new approach is being taken. It will include experimenting with new technology and materials such as fibreglass instead of steel. We'll be throwing away the textbook and starting from scratch.

**Hydro News:** Why not adopt the out of sight, out of mind approach and place the lines underground?

**Gathercole:** Right now the cost for high voltage lines is prohibitive. It's been estimated that putting a large transmission line underground may increase the cost five to 15 times. But much of the local distribution network is underground and this course is being pushed with increasing vigor. For the time being, emphasis should be placed on installing local distribution lines underground and improving the design of high-voltage lines. In developing our power grid system, with lines crossing the province, we are keeping this in mind. Right now, we're in the early stage of planning utility "corridors" so that when new lines are needed they would be built in these corridors and the need for acquiring land or disturbing land owners would be minimal.

**Hydro News:** To switch to the nuclear power scene, what is happening there?

**Gathercole:** This program has suffered from a number of disappointments and setbacks. However, in retrospect for a developmental program of such complexity and magnitude, perhaps this was to be expected. Certainly difficulties in getting



prototype nuclear equipment into service are not peculiar to Ontario. The United States, France, Sweden, Switzerland and Britain have experienced delays and escalating costs.

Douglas Point, the 200,000-kilowatt nuclear station on Lake Huron, provides a good example of the frustrations we've encountered. Owned by Atomic Energy of Canada Limited and run by Hydro, it has been in operation since 1967. Since then, the plant has had a series of malfunctions in the support systems—leaky pumps, faulty tubing and a locked fuelling machine, for instance. However, as teething problems are overcome, the plant will achieve more sustained performance.

Sometime in 1971, the first of the 540,000-kilowatt units at Pickering generating station, 20 miles east of downtown Toronto, is scheduled to produce first power. The remaining three units should follow at relatively short intervals. At present, a force of 3,000 is working around the clock to bring this about. It's estimated that 16 million man-hours will go into completing the station, which will have a capacity equal to Ontario's share of power at Niagara.

Certainly, our nuclear experience demonstrates that an organization just doesn't develop a brand new technology without growing pains.

**Hydro News:** Did the recently announced relocation of the 3,200,000-kilowatt nuclear station being built near Douglas Point reflect these growing pains?

**Gathercole:** I think it illustrates the difficulty Ontario Hydro faces in progressing at the greatest possible speed on the one hand, and having to comply with changing ground rules imposed by regulatory bodies on the other.

We really didn't **have** to move the Bruce generating station from the proximity of AECL's heavy water plant on the Douglas Point property. But the safety considerations put forth by the Heavy Water Safety Committee of the Atomic Energy Control Board would have meant such stringent precautions for workers that the overall cost would have been heavier had either we or AECL not made the move. Since AECL had a greater investment in the heavy water plant, it was decided that the nuclear plant site, not the heavy water plant, should be changed.

With growing pressure on all fossil fuel sources—coal, natural gas and particularly oil—nuclear power must be developed to meet the rapidly expanding needs of Ontario and other jurisdictions. Nuclear commitments by the electrical utilities have

*Hydro went on show in 1969 at the Ontario Science Centre in Don Mills. Meanwhile, the construction continued. Right, part of the new Nanticoke generating station on Lake Erie. Centre, equipment for stations such as this under inspection at the manufacturer's plant.*



had one effect of which few people are aware. They have contributed to the acquisition of fossil fuels at a lower price than would otherwise prevail. In other words, the nuclear program has tended to restrain the upward thrust of coal and oil prices.

At the same time, this restraint has created a tight supply-demand situation concerning coal. It could lead to higher prices in future because the nuclear program has discouraged the opening of new coal mines.

On the other hand, because Canadian nuclear generating stations are twice as expensive to build as comparable fossil-fuel plants, we cannot ignore the fact that the tightening money market and the unprecedented rise in interest rates on borrowed capital are compounding the financing of their construction.

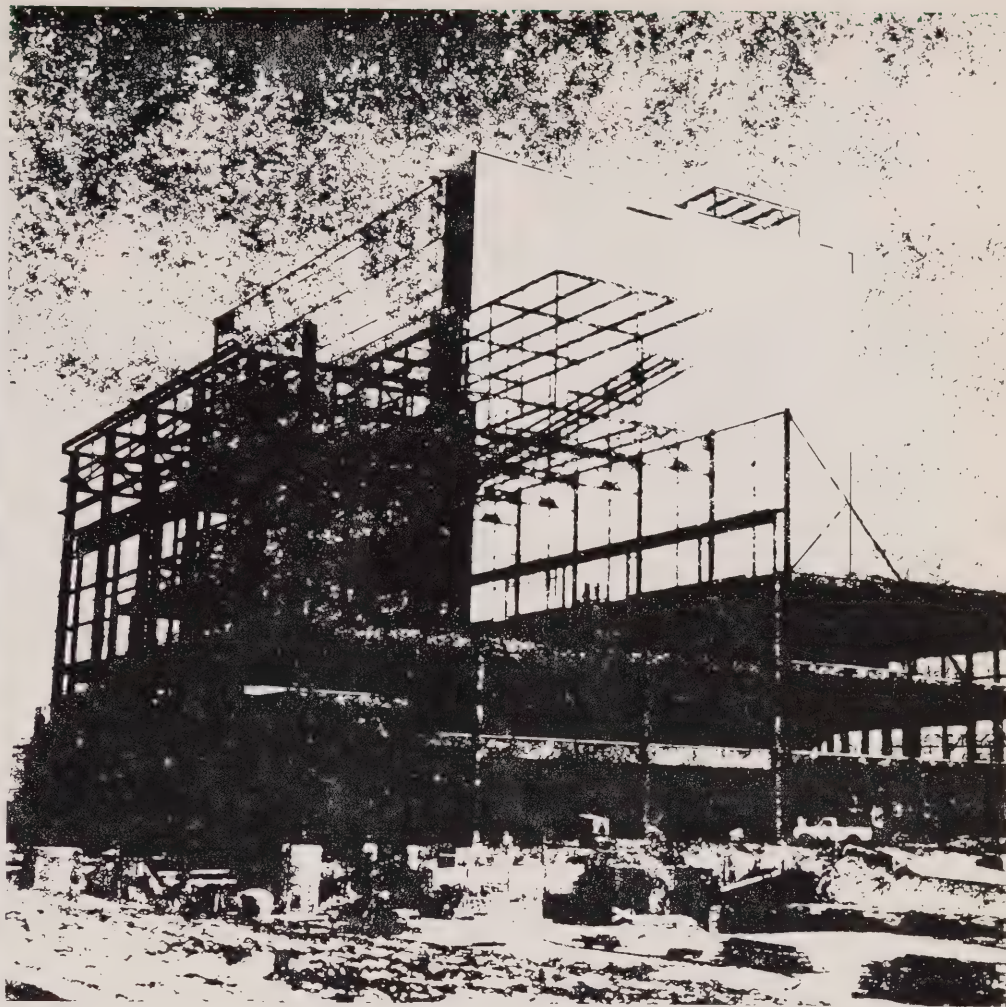
**Hydro News:** Somewhat earlier in our interview, you spoke about the OMEA and AMEU and their co-operation with Ontario

Hydro regarding rates and financing. Are there other areas where the groups meet with the commission?

**Gathercole:** Yes. For instance, we've had discussions with OMEA and AMEU representatives about aspects of regional government and how electrical utilities may best adapt themselves to it. This new municipal structure, instituted by the provincial government, went into effect in Ottawa-Carleton one year ago and in Lincoln-Welland and Thunder Bay this month. In the first two cases, the OMEA and AMEU have completed studies into the utility role in the expanded municipalities. Ontario Hydro also has its own task force looking at regional government. Views will be presented to the Minister of Municipal Affairs as a result of these studies.

We are agreed that electric service should be provided by a commission form of administration. Hydro as a business enterprise has no mandate to tax and is dependent on its revenue on its ability to market power in competition with oil and suppliers. It should operate as a com-





on adaptable to the conditions of the region.

**Hydro News:** Will you give us a rundown on the current construction program?

**Gathercole:** I've already talked about our Pickering and Lambton stations so I'll turn to the \$284 million Nanticoke generating station going up on the shore of Lake Erie, east of Port Dover. One feature of this station is the 655-foot stack which was completed last fall, at least the outer shell of it. Although the station building itself is 10 storeys high, it's dwarfed by the chimney, the first and most efficient of its type in North America. Power from the first 200,000-kilowatt unit is due in 1971. Remaining units are scheduled to feed power into the provincial grid at the rate of one a year until 1974, when the full 200,000-kilowatt capacity is reached. As a matter of social interest, I might point out that Hydro has been carrying out, along with other organizations, a survey of

both water and air in the vicinity. Since this program will continue for some time, we should have a "before" and "after" picture of the environmental effect of the plant.

The last of a series of hydraulic sites that have been under development—Lower Notch, a \$69.3 million station on the Montreal River south of Cobalt, should be producing power next year. The work force on this project reached the 1,100 level last fall. H. G. Acres and Company is the prime contractor for the 228,000-kilowatt plant.

The second phase of the 230,000-volt interconnection between Northwestern Ontario and the balance of the province was completed last fall. The final 100-mile stretch of line, between Wawa and Aubrey Falls, will be forged this year. It will allow the transfer of power in either direction over our own lines for the first time. Other construction of transmission lines in Northwestern Ontario is going ahead. By 1972 when these lines are completed, power will come from Manitoba's Nelson River into Ontario. Built at a combined cost of over \$100 million, these transmission lines will

result in an integrated grid of about 21,000 miles of line.

**Hydro News:** Finally, a look into the future. What can we expect of the 1970s?

**Gathercole:** Every decade brings its problems, challenges and achievements. I have great confidence in the future of Ontario. There are many signs that we are in the midst of an economic slowdown. The tempo of business is slackening. But Ontario and Canada have the strength to weather it. Long-term prospects are bright.

However, inflation will still be a stubborn reality and if it is to be abated, stern measures will be needed. Capital borrowings will press heavily on money markets, which will continue to be tight, and interest rates high.

As far as Hydro is concerned we have to look to continuing expansion. Bringing in prototype equipment will be a great challenge. Demand for electricity is forecast to double during the decade. So we have a formidable job ahead. □



# ghost



Automated train hauls 400 tons of uranium ore off floor between New Quirke mine and Quirke Mill.

Anyone encountering a solitary train near the uranium mining community of Elliot Lake in the not too distant future might well be excused for assuming there's a ghostly driver in the cab.

In fact there'll be no engineer at all, spook or otherwise. The powerful electric locomotive, which hourly pulls 400 tons of potential fuel for the world's nuclear stations, will be operated by radio control.

At present, the train, plying the one-and-a-quarter miles between Rio Algom's New Quirke mine and Quirke mill, is only semi-automatic. As it approaches the loading zone, the driver is able to knock it into remote control and climb up to take charge of a loading chute above the slowly moving ore cars. When all are filled he climbs down and heads for the mill at a brisk 20 miles an hour.

Shed doors wawn open at the train's approach and the load is dumped automatically as the cars pass over a hopper. A conveyor belt 40 feet below the tracks carries the ore into the mill.

Trucks, conveyor belts and even pipeline transportation were considered before Rio Algom finally settled on the \$1½ million railroad. "We then visited three similar installations and incorporated the strong points from all three into our design," said a company spokesman.

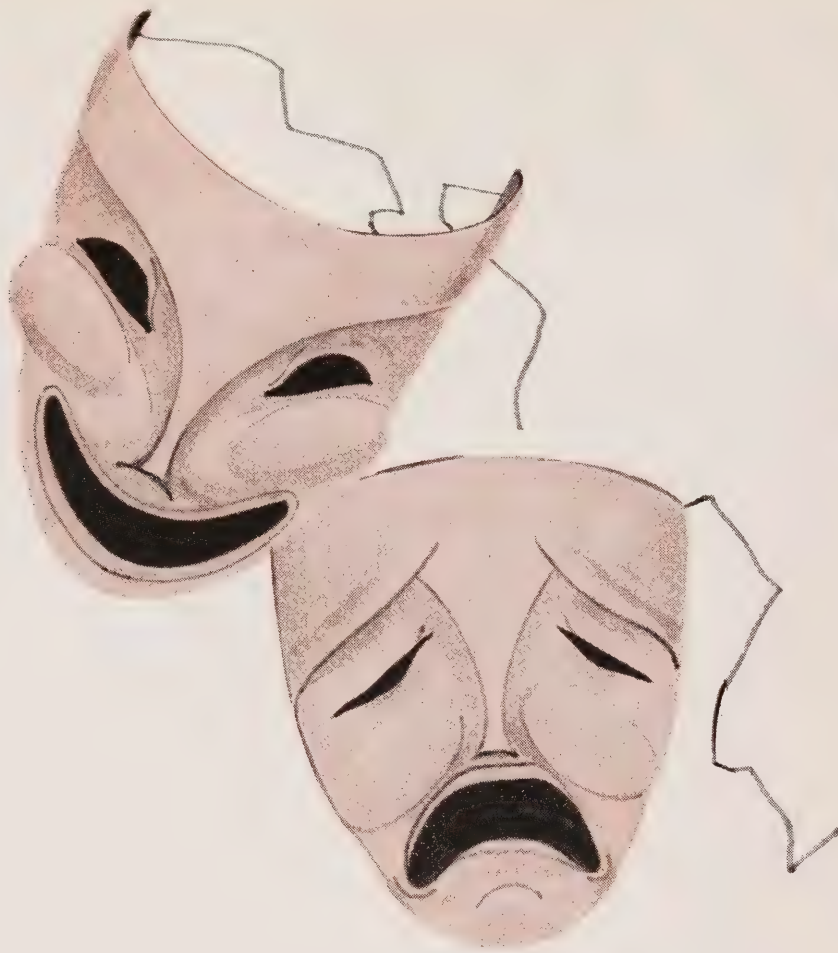
Rio Algom's decision marks a growing trend in Ontario for mining companies to put electric power to an increasing number of uses. This is particularly true in the uranium mining industry where the chief end product is electricity. □



# train







# 9.1

"Quiet on the floor." The girl operating the TV camera twice her size trains it on the interviewer. On the color monitor appear the words "Here's Debbie - With Debbie Anderson."

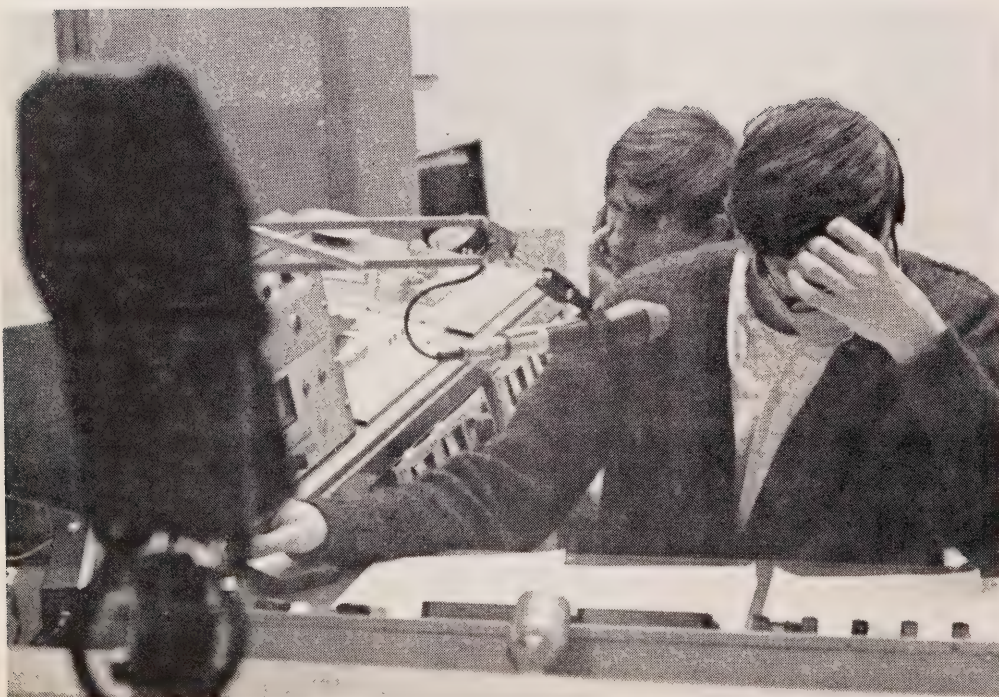
Never heard of Debbie Anderson? Well, maybe not, even though she's a competent interviewer. Debbie's show was never broadcast beyond the studio at Ryerson Polytechnical Institute in Toronto. Debbie, a third-year student in the institute's Radio and Television Arts (RTA) course, was interviewing the new head of the course, John Twomey.

Twomey, of medium height, dark-haired and bespectacled, looks more like a scientist or medical consultant, although he's actually one of the top teachers in the communications business. He joined Ryerson last August with an open invitation to "upgrade and update the radio and television arts course." Since then he's been making the fur fly.

"We've got to keep in step with the rapid changes taking place in the communications industry," he says. "Canadian radio celebrated its fiftieth anniversary in November. The next 10 years will be as dynamic for the communications industry as the last 50."

Mr. Twomey forecasts tremendous change through such developments as satellite communications, cable TV and cartridge videotape. He sees the need to emphasize Canadian requirements. (Already, he's thrown out the American textbook used in his broadcast management course).

He hopes to break new ground in Canada by extending the present three-year course into a four-year degree course. He has been planning for adult education and has been upgrading the Ryerson radio station with this partly in mind.





Mr. Twomey is well qualified for his ambitious task. Now 40, he has experience as TV writer, producer and supervisor of programs. He holds an MA in communications from the University of Chicago.

He worked eight years for CBC, was executive producer of "Friendly Giant", "Passport to Adventure" and "Butternut Square". Later, he became assistant supervisor of schools and youth programming

# ...the voice of Ryerson

by Sheila Kenyon

the CBC. He has also worked as a communications consultant for the United Church and as a project officer for the Ontario Institute for Studies in Education.

In another area Mr. Twomey wants to investigate is that of employment opportunities for broadcasters. Most graduates of television stations, educational TV and advertising agencies to work as anything from camera operators to directors and producers. But Mr. Twomey wants a more comprehensive estimate of manpower needs.

What do former students think about the long, hard road to the top?

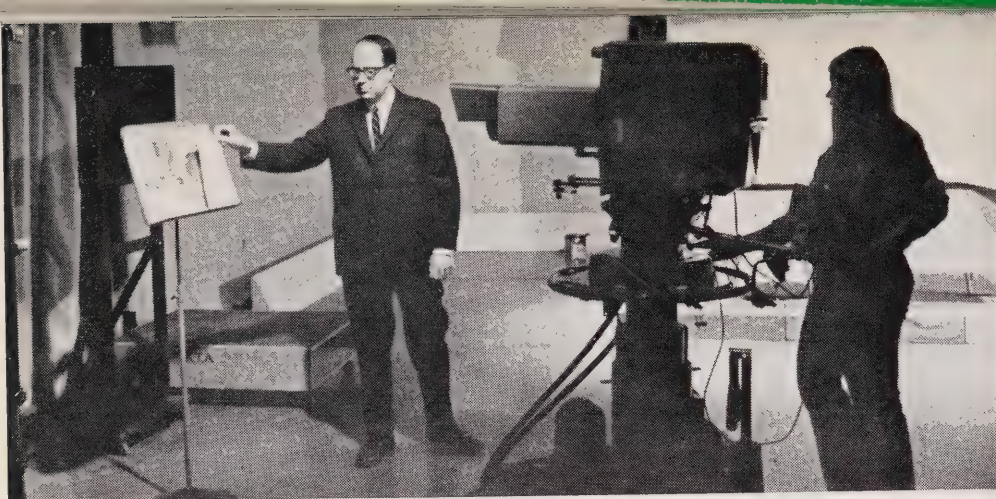
"Specialization is coming very much to the fore in the TV industry today," says Ron Pelcher, who graduated from Ryerson in 1954 and is now production manager of CHCH-TV, Hamilton. "However, there is no quick way to the top in broadcasting. I worked as an announcer, copy chief and in the commercial production area before becoming a production manager."

Other successful Ryerson graduates — fatherman Dave Duval and newscaster Tony Parsons, of CFTO-TV, Toronto — both say they progressed first through smaller TV stations.

"Broadcasting is exciting and frustrating and you have to be aggressive and forceful to get ahead," says Vivian Wilson, a '61 graduate and script assistant for CBC's







new "Week-End." The station manager where she worked while in high school tried to dissuade her from going to Ryerson to study broadcasting. "I'm glad I did," adds Vivian.

The present three-year course at Ryerson began as a crash course for radio announcers made available to World War II veterans as part of the Department of Veterans' Affairs rehabilitation program. When the DVA courses ended in 1948, the training facilities became The Ryerson Institute of Technology.

The nine-month radio course continued until 1950 when, with the advent of television, training in the new medium was added and a formal two-year course

established. Academic subjects were included.

Three years later, another year was added, concentrating on television direction and production, television writing, motion picture photography and theatre arts. Today, students also study the humanities and social subjects including economic theory, social sciences, political geography, 19th and 20th century history, politics and western thought.

About 300 students are enrolled in the present course. Ontario students are accepted with a Grade 13 diploma. Students from outside the province must have equivalent academic standing.

As well as providing students with equip-

ment equivalent to that in the most advanced broadcasting stations in the country (black and white and color television studios and complete production facilities for documentaries and drama). Ryerson is the only training centre in Canada with direct access to a radio station — CJRT-FM.

Ryerson's FM station is licensed like any other radio station. It is operated by a professional team under manager D. C. Stone. It has its own building only a short distance from the school.

Several years ago, the station was operated entirely by the students. "In those days FM radio was so new that few of the students had FM radios to hear it," says one Ryerson grad.

Operation of the station is now carried out by professionals largely because students find it impossible to keep up with full-time programming demands.

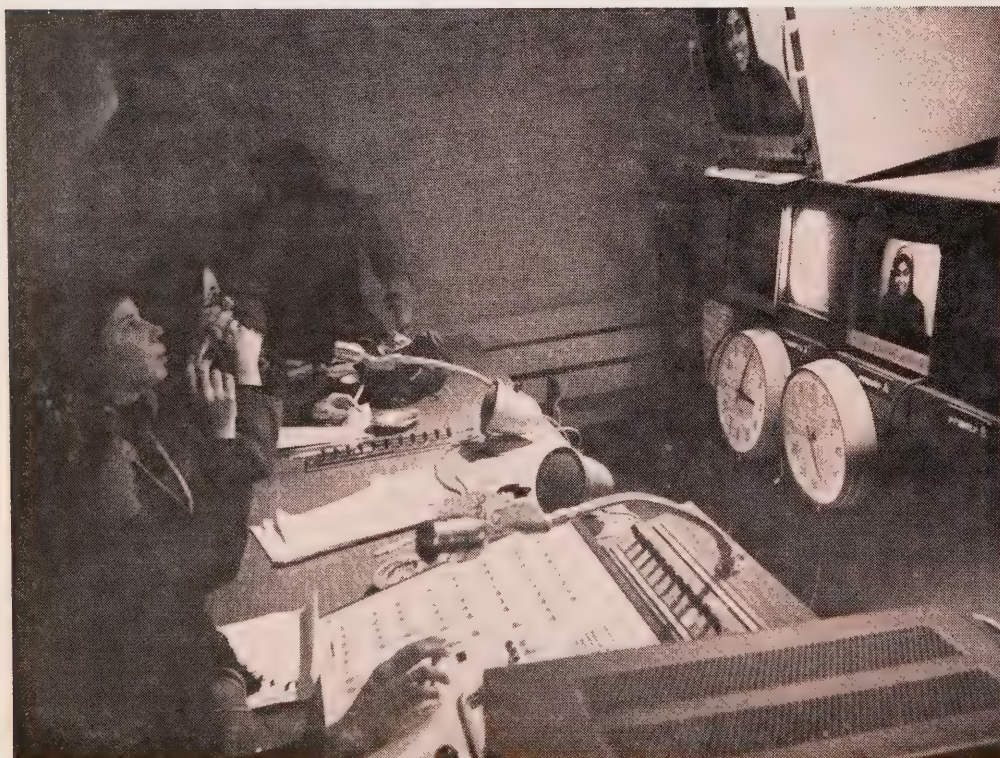
Ron McKee, assistant station manager and a Ryerson graduate, left commercial broadcasting to join CJRT-FM because he wanted to work in a non-commercial environment. "CJRT-FM is one of several education stations in Canada. But we are in a unique position because this station is the only one run by a team of professional broadcasters," he says.

CJRT-FM offers its audience classical music, news, coverage of educational seminars and teach-ins, reports on science, business affairs and the opportunity to tune in on Canada's largest collection of jazz music. Its broadcasts are available for pick-up by other stations.

Sixty per cent of the air time is handled by students from the RTA course. Second year students, who must study radio broadcasting, are responsible for Saturday shows from 3-6 p.m. Five third-year students work on the station staff on a part-time basis as announcers and operators. Station newscasts are 30 minutes duration and include the day's news and weather along with in-depth comments on the news.

Last May, CJRT-FM launched a radio study program aimed at adult education. It is hoped eventually to offer formal courses leading to Ryerson accreditation to people unable to attend classes.

Three radio study courses are available. "A History of Music" is a 20-part series under Lionel Willis, who teaches music literature at Ryerson. The course covers the changing fashions and characteristic of western music and composers. The second course, "Human Behavior," consists of 12 broadcasts covering the basis of human nature and problems of human living. Michael Jones, a psychologist,





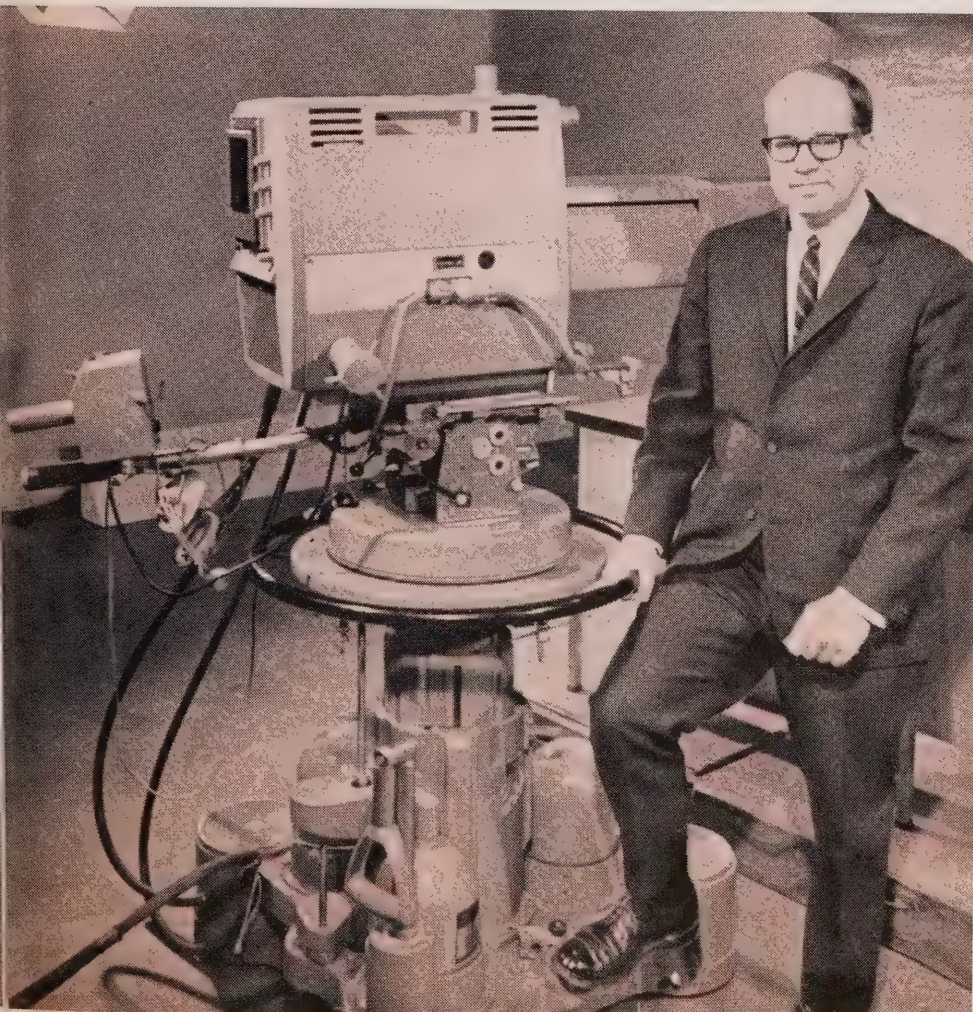
radio study students are charged a small fee which provides them with textbooks and other pertinent materials. To date, there are about 300 people enrolled in the three programs. Mr. Twomey would like

to see radio study students numbering in the thousands.

"One of our problems," says Mr. McKee, "is the fact that operating costs rather limit the amount of money we have to pay guests and interviewers to produce programs. We feel that CJRT-FM is in a unique position to carry out research in better programming and to experiment with equipment. For instance, we are one of the few stations in Canada using automatic equipment — by using automation we are able to offer classical music from

midnight to 6 a.m. We've had lots of inquiries about this from other radio stations."

Access to CJRT-FM and a four-year course covering all areas of radio and TV from behind the camera to acting and announcing should produce professional broadcasters of the highest quality. Add to this John Twomey's driving force and Ryerson's RTA course should be one of the most comprehensive and relevant in North America. □



*Ryerson's equipment is as sophisticated as any in Canada and students are seen in action in the ultra-modern TV studios. At left is the head of the course, John Twomey.*

photos: Harry Wilson



**Announcing an unusual marriage of American  
and Canadian waters in the honeymoon city in  
a dramatic saga entitled ...**

# **the year the falls stood still**

by Les Dobson





the year, 1848. The place, Niagara Falls, an eerie and oppressive silence settled over the normally thundering cataracts this relatively warm March evening. Bewildered settlers flocked uneasily to the river banks to see only drying mud and scattered puddles by the light of their blazing torches.

The mighty Niagara River had ceased to flow. Next day, the more adventurous scrambled into the steep gorge below the falls. A detachment of US Cavalry defied the unknown by riding across the dried-up bed.

Portents of doom spread quickly among these God-fearing people. Especially so because local spiritualist William Miller had four years previously prepared his followers for the end of the world. But, in spite of the prevailing dread, there was a perfectly normal explanation.

Heavy winds aided by the unusually mild weather had broken up a gigantic ice field in Lake Erie, jamming the mouth of the Niagara River with thousands of tons of ice. Nature's dam was so effective that it completely stemmed the flow. It took more than 24 hours for the waters to break through. And then they came foaming down the river to plunge over the falls with a tremendous roar.

Twice more – in 1920 and in 1936 – ice jams repeated the phenomenon, though to lesser degree.

But last year man himself dared to interfere with the American Falls, and they remained dry for six months while a unit from the US Army Corps of Engineers drilled, probed and scraped around the 10-foot precipice. Their \$1.5 million investigation came after years of complaints that rock falls were spoiling the beauty of this tourist mecca and might ultimately result in nothing but a series of rapids. Their report – to be ready by the fall of 1971 – will suggest possible ways of remedying the situation.

Turning off the tap was done with military precision. Early in June, a rock and earth tfferdam was bulldozed between the American mainland and Goat Island. The Corps gave the contractor 30 days to block the falls, thinking he could do the job in 15. He said it would take a week. "We finished it in three days," said Roger App, a US Army spokesman.

Operating day and night, a steady procession of trucks dumped tons of fine fill into the river until the water roared through a narrow channel at such speed that any additional material was quickly washed away. The gap was plugged with large boulders and packed with earth. Dramatically, the flood of water dwindled to a trickle. Scavenging gulls swooped down



*Dried-up American Falls are in pathetic contrast with the river in full spate.*

to peck in the green slime as the river bed was exposed.

An immediate problem was to prevent the face of the precipice from drying out and crumbling. The hard cap of Lockport dolomite was sound enough, but the underlying Rochester shale would suffer where exposed to the air. To avoid this,

a water sprinkler system was installed to keep the exposed rocks moist. Even the few stunted trees clinging precariously to the brink were sprayed throughout the hot summer months.

Of course, the exposed river bed ravaged by potholes and fissures was a geologist's dream. Before the work began, it was





thought that erosion of the softer shale face, undermining the dolomite cap, was responsible for the accumulation of debris at the base of the falls. Subsequent examination showed the degree of overhang to be less than expected.

Geologists now theorize that the falls are being squeezed out of position — a result of forces set in motion by the giant glaciers that once covered much of North America. Estimates as to the age of the falls themselves range anywhere between 10,000 and 25,000 years.

There have been three recorded slides, the most spectacular in July, 1954, when 185,000 tons of rock plummeted into the gorge. In some places, the talus or debris is 135 feet high and has reduced the drop of the falls to about 45 feet. In all, there's an estimated 358,000 tons lying there.

Aggravating the condition of the overlying dolomite are joints or fractures in the rock which begin to open up due to tension in the overhanging blocks. Water flows along the joints, building up hydro-

static pressure, and the cap rock collapses. Usually, the failure occurs along the joints, which intersect the crest of the falls at an angle. This has resulted in a sawtooth pattern along the crest.

Cores from about 25 holes were examined for clues about the rock strata and joints. Red and green dyes were pumped into some of the holes under pressure to assess the permeability of the underlying rock. Dye pumped in near Prospect Point emerged 20 to 30 feet below the crestline. In another test, the dye came out in the lower river.

Stress tests included the removal of the core holes themselves by drilling around them — a process known as overcoring. The result is a hollow core, much like a piece of drainpipe. Sensitive instruments placed in the drilled-out section of the core can then determine whether it has expanded since removal and was therefore under stress.

Throughout the work, highly sensitive instruments capable of recording horizontal and vertical movements of one-thousandth of an inch were set up to spot any movement which might herald another rock fall. No such shift was detected.

Canada shared in the cost of the investigations and Ontario Hydro became active involved about a year ago with a request from the Canadian government to survey the treacherous waters around the base of the American Falls. Detailed drawings of the river bed were required by geologists and engineers. Hydro had the specialized equipment for such a survey.

Topographers from the Hydraulic Development department plotted the contours with electronic sounding apparatus aboard an extremely stable boat. Designed primarily for use in the rapids of northern rivers, the craft is powered by a jet of





*Engineers are lowered in cage to inspect the face of the falls, which is continuously sprayed with water to prevent the rock from drying out and crumbling. Activities on the crest of the falls include delicate drilling and measuring operations. Observations are recorded for later analysis.*



ter instead of a propeller, which might  
ily foul. It was kept on an accurate  
urse in the Niagara River by "homing"  
ng the beam from a transit-mounted  
er set up on the Rainbow Bridge.

m the point of view of power produc-  
n, both Ontario Hydro and the New  
k State Power Authority gained from the  
dy. They generated extra low-cost  
ver from the water that would normally  
passed over the American Falls. In  
firm, both utilities contributed more  
n \$250,000 each toward the cost of

the tests. Water continued to flow over  
the Horseshoe Falls during the investi-  
gations. These falls were the subject of  
an extensive remedial program between  
1954 and 1957 which reduced erosion of  
the crest from several feet to only inches  
a year.

What remedial measures, if any, are  
recommended for the American Falls will  
be based upon the geological and engi-  
neering opinions formed after all the data  
from the 1969 investigations has been  
carefully sifted and collated.

Possibilities cover a variety of options or  
combinations ranging from total or partial  
removal of the talus and facing of the  
Rochester shale to even anchoring the  
dolomite cap to the underlying shale with  
steel cables threaded through an intricate  
network of tunnels.

For the moment, the American Falls  
are again providing their breath-taking  
spectacle 24 hours a day, seven days a  
week. But, in the interests of beauty —  
and tourist dollars — the tap may have to be  
turned once more. □



# Thunder Bay:

## fairy coach





# or pumpkin?

by Jim Blackwell

With the stroke of midnight on December 31, the twin Ontario cities of Fort William and Port Arthur ceased to exist. In their place stands a thriving new community – administratively, that is – of 100,000 souls. Enter the city of Thunder Bay.

Of course, a change of name or even an amalgamation doesn't spell instant success. Only time will tell whether those dozen festive chimes heralded a fairy coach or pumpkin. But an atmosphere of quiet optimism prevails among the offices and subdivisions sprawling in the shadow of Mount McKay.

Ironically, the wheel has turned full circle within the relatively short space of 75 years. Fort William, once an important fur trading outlet, and Port Arthur were then both part of the same municipality of Shuniah, which this year they absorbed.

Originally – before Municipal Affairs Minister Darcy McKeough and regional government – Shuniah covered more than 400 square miles and included the four municipalities which are now merged into one – Fort William, Port Arthur, Neebing and McIntyre (the major portion of Shuniah after the others broke away).

Fort William became a separate township in 1892 and Port Arthur followed a year later. Neebing broke away after the turn of the century.

Unlike Humpty Dumpty, the most important pieces have been put together again and it is interesting to speculate what the future may hold for them.

Queen's Park and local organizations are literally overflowing with social and economic studies conducted in, and about the northern part of Ontario. But one that is particularly relevant and timely is a study conducted by Read, Voorhees and Associates, which contains 12 points about the prospects for the new city.

Actually termed an Urban Transportation Study, the report was not limited in its scope and in its general analysis of the area situation was cautious about the socio-economic growth of Thunder Bay.

It suggests, for instance, that one of the area's greatest potentials is the new city itself. It observes that supporters of amalgamation, particularly the business community, are optimistic that unification, with the resulting single voice, will cause an increase in development, expanded employment opportunities and, finally, an influx of population to take advantage of these opportunities.

In their list of positive factors, the consultants

include the development of Lakehead University and construction of the \$5 million Confederation College, one of the province's community colleges.

On the downside is the present and rather bleak population picture. Growth rates in Fort William – Port Arthur are well below the provincial average, showing an increase of less than one per cent in four of the past five years.

Age statistics are also in the Lakehead's disfavor with 1966 figures revealing that the number of persons 10 years and under is below the provincial average along with the 20–34 group. However, the number of 35–64 year olds and the number over 65 is greater than the provincial average. Add to that the fact that the birth rate for the city is declining faster than the average birth rate for the province and a rather sorry picture is painted.

The report notes: "None of the preceding observations suggests a healthy upswing

*Awakening at the head of Lake Superior, two cities are now one. Right: construction continues at the Lakehead University.*



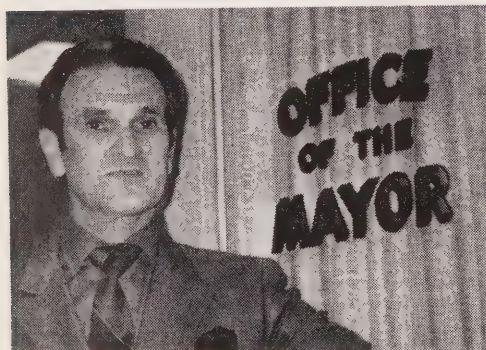


in the rate of population growth for the City of Thunder Bay. In other words, the immediate past does not predict a rapidly developing future. If the area is to grow substantially, other factors will have to be found to bring it about."

Not that statements like this are allowed to cast gloom for long. Far from it. A study conducted by the local urban renewal program in the form of a questionnaire revealed that ordinary residents are generally satisfied with their community. Even among the lower income group, 84 per cent said it was a good community to live in and 70 per cent of all those questioned expressed satisfaction with the way things are.

Interviews with downtown merchants showed they are overwhelmingly happy, most of them being situated in the same location for over 25 years. The questionnaire revealed optimism among businessmen, with 20 per cent planning expansion and 30 per cent planning renovations.

But any metropolitan area should also seek to attract new business, particularly secondary industry. And Mayor Saul Laskin says he has received numerous inquiries about the possibility of establishing industry in the new city.



Saul Laskin

With increased federal incentives for industry moving into the area, many people feel that Thunder Bay is ready to move into high gear. "It is known many industrial and commercial enterprises are planning intensive investigations and feasibility studies to participate in the industry incentive plans," says Industrial Commissioner Jerry McFadden. "With new industries come new services and presently a rush is on to secure well situated land."

Mr. McFadden also notes that primary industries are beginning to blossom in the immediate area and a \$120 million nickel mining and smelter complex could soon become a reality less than 40 miles from Thunder Bay.

"Thunder Bay stands astride natural growth channels and will benefit substantially in the years to come," he adds.

Harvey Johnson, secretary-manager of the Lakehead Chamber of Commerce, commented: "We jumped from 16th to sixth place in Ontario metro status, and on the Canadian scene we were hoisted with amalgamation from 29th to 12th.

"For the purpose of proper commercial, residential and industrial planning, we are now zeroed in on one authority whose interest will command the orderly development of community services for the public betterment. Consolidation is bound to attract new industry and venture money."

But with amalgamation and increased size comes the possibility of higher taxes. Mr. Johnson says: "The chamber at no time predicted reduction of taxes as a result of amalgamation. We maintain, however, that there would be more value received for every civic or grant dollar spent."

One organization which hopes to better itself and the community financially is the Lakehead Convention Bureau. According to Ald. George Lovelady, the president, the bureau hopes to attract more funds for promotion from the new city. It is already engaged as the primary force behind selling the name Thunder Bay across Canada and through the Mid-western United States. For this, the new council of Thunder Bay has appropriated \$25,000.

Mr. Lovelady says 1969 saw more than \$1 million in convention money pour into the Lakehead economy and it is expected that 1970 will be an even bigger year. More than 10 major conventions have already been booked.

On the other hand, the Fort William - Port Arthur District Labor Council is taking a "wait-and-see attitude." President Frank Mazur says that although the council was pro-amalgamation, they hope it will work in the best interest of the residents.

The council has asked that residential taxes be maintained at the 1969 level until the federal and provincial governments can bring in a more equitable tax structure. In addition to taxation, the council has expressed a deep interest in low-rental housing. According to Mr. Mazur: "What the hell have we got now . . . \$20,000 to \$30,000 homes. They are completely out of touch for the ordinary Joe making \$4,000 to \$5,000 a year."

Undoubtedly, Thunder Bay stands on the threshold of a challenging new era. With a new name, a streamlined administration and lots of optimism, it is well prepared. □

## Problems, problems

Welding two cities into one is bound to create problems and the newly-formed Thunder Bay Hydro has its share.

The system embraces what was formerly Fort William Hydro and Port Arthur PUC together with parts of the townships of Neebing and McIntyre.

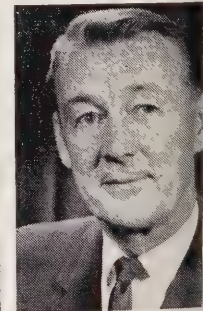
"Our major task is to equalize rates within the new boundaries and marry the systems into one as far as manpower is concerned," says James Currie, chairman of the new commission. Total integration may never be entirely possible because the old Port Arthur and Fort William systems operated at different voltages. Staff will have to be trained to work on both systems.

In addition to electric power, Port Arthur PUC used to handle transportation, telephones and water. These functions are not taken over by city council. Fort William's commission was responsible only for the distribution of electricity.

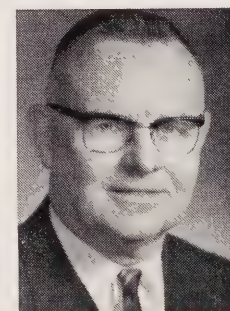
Headed by Mr. Currie, the specially appointed quintette responsible for power in Thunder Bay also comprises commissioners L. E. Danis, W. O. Spicer, Waino Laakso and Mayor Saul Laskin. The general manager is E. A. Vigars with Don Shipstone as secretary-treasurer, J. C. Gilmore as chief engineer and Evald Ounpuu as operations manager. □



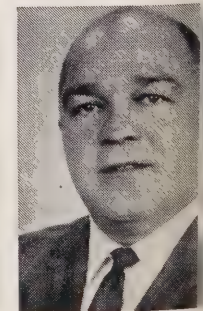
L. E. Danis



W. Laakso



W. O. Spicer



J. Currie



# along hydro lines

## Text ... a Metro Hamilton

metropolitan system similar to that of Metro Toronto has been proposed for the Hamilton – Burlington – Wentworth County area by the Steele Commission. The new municipality would cover twice the area of Metropolitan Toronto and have about a quarter of the population.

The Steele report envisions a two-tier government for a four-borough, two-city metropolitan region. The cities would be Hamilton and Burlington while the areas of Dundas-Ancaster, North Wentworth, South Wentworth and Grimsby-Stoney Creek would become boroughs.

While the report suggests that local councils should distribute water in the new region, it recommends that electric power be handled by the existing Hamilton and Burlington commissions. It further suggests that a third commission service the boroughs of North Wentworth and Dundas-Ancaster and a fourth the boroughs of South Wentworth and Grimsby-Stoney Creek. Such a scheme would involve the disappearance of several small municipalities.

Municipal Affairs Minister Darcy McKeough has asked for submission of arguments on the report to be in his hands by March 1.

## Better late ...

It is a delight to take a night stroll through Thunder Bay's Boulevard Lake Park with its bright walkways and parking area and its colorfully-lit trees.

Although an inaugural cairn was unveiled only a short time ago, the lighting is Port Arthur PUC's Centennial project. It was delayed by technical problems and difficulty in getting equipment. The \$20,000 scheme required about 3,000 feet of trenching and nearly four miles of underground cable. It was installed jointly by crews from the PUC and the city's works department. The Port Arthur and Fort William utilities amalgamated this month to form a new electric commission of Thunder Bay (see page 18).

## Thimble camera

The Moscow Institute of Automation and Telemechanics has come up with a television "camera" the size of a thimble. Designed as convenient and dependable, the device uses only a few tenths of a watt in power. The role of its "eye" is taken by a fine layer of semi-conductor monocrystal. The microcamera is designed for industrial use – checking inaccessible areas or controlling automatic processes. Among the possible areas of employment is peeking at the geological layers in an oil well.

## A good year

Output from Canadian electrical manufacturers in 1969 exceeded \$2.5 billion, an increase of about 11 per cent over the preceding year.

"This reflects an increase in all segments of the industry with the major appliance, TV and radio builders leading the way," said T. A. Lindsay, president of the Canadian Electrical Manufacturers Association.

He said the plans for capital spending by major Canadian companies indicate that the demand for non-consumer electrical products will remain strong this year. This is especially true for commercial communications equipment and supplies where a world-wide shortage exists.

Mr. Lindsay, who is president of Phillips Cables, Brockville, indicated that consumer products will show continuing strength. While predicting an eight or nine per cent increase in output, he said it could be influenced by a change in government fiscal policies. Prices are expected to increase marginally in 1970, but Mr. Lindsay emphasized that the average price of electrical products in Canada will still be below the level of 10 years ago.

## Skating spectacular

Peggy Fleming, three-time winner of the world figure skating crown, headlined a TV color spectacular on the nation-wide CBC network last month.

Sharing the spotlight with Miss Fleming at Madison Square Garden, New York, were members of the Ice Follies including former Canadian and world figure skating champion Donald Jackson.

Ontario Hydro sponsored the special on 13 Ontario stations and other Canadian Electrical Association members participated across the country.

## Metering plus

Although the forum was the annual Metermen's Workshop, Jack Anderson, president of the sponsoring Association of Municipal Electrical Utilities, ranged much further than metering in his keynote address.

"I know that you, like me, must be getting tired of hearing that we live in a rapidly changing world," he told the delegates. "We know it is changing and some of us wonder at times if it is changing for the better."

But there was one change that all people in the electrical industry should be prepared to talk about. "What I am referring to is the growing public disenchantment with the utility industry," said Mr. Anderson.

"I mean the telephone companies, electrical power companies and even our competitor – the gas company. At one time, 'the public accepted the need for construction activities, realizing that to have electrical power with all its advantages they would also have to live with tower lines and generating stations. Now there is a growing sentiment against utilities.'"

The AMEU president said that utilities in the US are noticing this disenchantment even more. Efforts to locate generating stations were "fought" through the courts, rights-of-way plans became snarled in red tape and rate increases were argued about and delayed. The result was a slowing down and, in some cases, a cancelling of construction projects.

"This is the temper of the times – to protest," he said.

Some US utilities were already advising their customers that voltage reductions would be necessary and that "brown-outs" might occur. In Canada, telephone service in some areas was being delayed weeks by a lack of necessary service equipment.

"The Hydro family in Ontario has always prided itself on



planning ahead to have power there — when the customer needs it," he said. "If this trend by the public — to resist the construction of new plants — increases, there is a possibility we may not be in a position to provide power when it is required."

It was realized that a lot of the opposition came from people deeply concerned about air and water pollution and unsightly power lines. "However, it must be realized that some form of compromise must be reached if the electrical utilities are to meet the demands put upon them."

Joe Duckworth, of Canadian Westinghouse, one of the several firms which had displays at the workshop, holds up a new slim meter for checking by Ian McLeod, centre, and Wesley Long, right. Both are from Gravenhurst Electric Light and Water.



*Groovy, isn't it?*

Other sessions of the two-day workshop ranged from such technical subjects as polyphase metering and transducers in electrical measurement to a talk by Metro Toronto Police Inspector Dave Cowan on breaking and entering by the modern criminal. The workshop is the creation of the AMEU's metering and service entrance equipment committee under A. D. Macpherson, of Toronto Hydro. □

## A touch of the blarney

John McMechan, former chairman of Toronto Hydro, always seems to introduce a touch of the blarney to any occasion and last month's dinner marking his retirement from the commission was no exception.



*Grocery clerk to president*

Making a presentation to Mr. McMechan, who emigrated from Ireland at the age of 19, "Big Daddy" Frederick Gardiner remarked that while he was born in Canada, his parents came from Ireland. Then Richard Horkins, who succeeds Mr. McMechan as Toronto Hydro chairman, also confessed to Irish parentage. Finally, former Controller Margaret Campbell, when presenting Mr. and Mrs. McMechan with a pin and cufflinks from the City of Toronto, revealed that she had an Irish grandmother.

On behalf of the commissioners and employees of Toronto Hydro, Mr. Gardiner presented Mr. McMechan with an illuminated address and an inscribed silver tray. "Our hope is that it will be tarnished with the wine of good fellowship and not brightened by the cold brilliance of disuse," he said.

Yet another gift came from OMEA president Henry Baldwin. Mr. McMechan also headed the provincial association during his 16 years as a commissioner.

Mr. McMechan started out in Toronto as a \$12-a-week grocery clerk and rose to become president of Donlands Dairy. He was chairman of the board of Toronto East General Hospital, director of several companies and an executive member of the Toronto Metropolitan Industrial Commission.

During his time with Toronto Hydro, the utility's assets have increased from \$98 million to \$223 million. He has been instrumental in a number of advances including the conversion from 25 to 60-cycle power, the replacement of overhead conductors to an underground system, the illumination of Bloor Street with sodium vapor lamps and the promotion of electric heating, particularly for high-rise apartments.

The dinner, which was attended by a large number of utility city and metro officials, also served to welcome Mr. Horkins, city alderman until his appointment. Mr. Horkins, who is associated with a firm of management consultants, was educated at Upper Canada College and the University of Toronto.

Mr. McMechan is seen addressing the audience, with Mr. Gardiner and Mr. Horkins at the head table.

## Quarter-century countdown



*Time for memories*

All right, chaps. Synchronize watches. The occasion was a dinner for about 80 persons celebrating 25 years or more with Wincan Utilities Commission. Among the new members are Les Thorpe, Reg Morley, Russ Quinn and Walter Belmore. At the right is Les Treuge, who received a crisp \$100 bill to mark 40 years with the utility.

## Blazing the way

Were it not for Ontario Hydro there'd be few Christmas lights and it was unexpected but somehow appropriate that the display outside Hydro's head office on University Avenue should receive kudos last month.

The display took top prize for local business organizations in the "Beautify Toronto" contest sponsored by the Young Men's Association.



Canadian Club. Maclean-Hunter, also on University, were the winners-up. There were also classes for private homes and apartment buildings.



*...a more beautiful Toronto*

"We usually run a campaign each year encouraging citizens and businessmen to take a pride in their city, but this was the first time we'd extended it through the Christmas season," said William McKay, secretary of the organizing committee. "We appealed to people through the press and radio to write in and nominate buildings in the various classes. We got more replies three weeks than we normally get all summer."

Seen receiving the trophy from former Controller Margaret Campbell, deputizing for Toronto Mayor William Dennison, is James A. Blay, Hydro's director of public relations. In the background is John Ross, Jr., chairman of the Beautify Toronto Committee. Both the city and local business supported the campaign financially. □

## Switch to oil

will be used to fuel Ontario Hydro's Lennox generating station Bath, 22 miles from Kingston. The decision comes after months of study by Hydro experts. Six other fossil-fuel power stations in Ontario either operating or under construction are all designed to burn coal.

It will be cheaper to deliver oil to Lennox, located at the eastern end of Lake Ontario, than to transport coal from US mines. Plans are to bring Caribbean oil by supertanker to Quebec, then transfer to the largest available Great Lakes tankers. Oil storage tanks will replace the conventional coal pile at the power station.

At present, demand for coal in the US far exceeds the supply, pushing up prices and causing delays in delivery. Canadian refineries are not producing residual fuel oil either in sufficient quantities or at a competitive price with that obtainable from the Caribbean.

Orders for the four steam generators at Lennox have already been placed with Combustion Engineering-Superheater Ltd., of Montreal, at a cost of about \$37 million. Lennox is expected to produce its first power in 1974. □

## ally around the symbol

or code it red, black and white and it's electrical enough to make the new symbol of the Ontario Electrical League.

It will soon be a familiar sight across the province," says C. B. C. Scott, OEL manager. It will be used for stationery, membership certificates, truck decals and other promotional material in the

3,000-member organization. The league embraces manufacturers, distributors, contractors, Ontario Hydro and municipal electrical utilities.

The new symbol weaves the OEL initials into a contemporary figure — an O is made by an electrical cord; the E is a three-pronged plug and the red L stands for the league. And, as any budding student in electrical theory knows, the colors stand for the coding of two-phase wiring and ground.

"We are looking for a new corporate identity, in line with modern concepts, as a rallying point for chapter members," Mr. Scott adds. □



## Merger study

Ontario Hydro's Georgian Bay and Central regions are being studied with a view to the possible reorganization and amalgamation of the two regions.

The study is part of a continuing search to achieve administrative economies and savings consistent with the maintenance of a high standard of service. With the emergence of new administrative and operating techniques, Hydro has been able to achieve economies over the years by realigning the boundaries of its major operating regions. At present there are seven.

"It has been estimated that savings of up to \$500,000 a year could be realized from such a reorganization," said Chairman George Gathercole, announcing the study last month.

This saving would not be realized immediately because any reorganization would be carried out gradually over a number of years to smooth out the impact on personnel. It is expected that some units would remain at their present locations for a considerable time. □

## Labor relations expert dies



C. B. C. Scott

Ontario Hydro's former assistant general manager — personnel, C.B.C. Scott, died last month at the age of 66.

Mr. Scott retired from Hydro in 1968 after 11 years' service. He had a broad knowledge of labor relations and his most recent appointment was as a management member of the Ontario Arbitration Commission.

A 1925 graduate of the University of Toronto in commerce and finance, Mr. Scott served for many years in the manufacturing, personnel and industrial relations fields. During World War II, he was a member of the Regional War Labor Board for Ontario and in 1949 was chosen Canadian employer delegate to

the International Labour Organization in Geneva. He was chosen again in 1961 and 1967.

Mr. Scott also served as chairman of both the National Indus-



trial Relations Committee and the Ontario Division Labour Relations Committee of the Canadian Manufacturers' Association. He also became chairman of the Industrial Relations Committee of the Toronto Board of Trade and president of the Technical Service Council. □

## Following the sun

France's National Centre for Scientific Research has built a solar furnace which dwarfs anything of its kind in the world. And it's being used for tasks that range from testing the flash effects of atomic bombs to the production of exotic substances for the electronics industry.

Although its 20,000 mirrors have not been fully aligned, the furnace is operating well enough to melt a hole through a half-inch steel plate in 50 seconds.

Set up in the Pyrenees, France's sunniest region, the super furnace consists of three basic elements. A series of 63 flat mirror panels, each holding 180 small mirrors, is mounted on a hillside. Each panel has its own electric eye, enabling it to follow the sun across the sky. The second element is a parabolic array of 9,000 mirrors mounted to form the north-facing wall of a nine-storey building. The paraboloid collects the reflected sunlight from the hill-mounted panels and focuses them on the material to be exposed to the extreme heat. This is located in a tower opposite the paraboloid.

The temperature at the seven-inch bullseye will reach 7,000 degrees Fahrenheit when all the mirrors are perfectly in focus next summer. While conventional furnaces reach high temperatures, the French development allows materials to be heated uncontaminated by parts of the furnace such as electrodes or even the furnace walls. □

## municipal briefs

For many years an employee of Brantford PUC, William Emslie has retired as superintendent of the Hydro department. Mr. Emslie joined the transportation department in 1929 and worked there until 1943 by which time he was superintendent of the bus and car barns. He returned to the PUC in 1945, joining the Hydro end of the business. Commission and friends threw a party in his honor last month.

Electric heating will be installed in 250 homes for Sudbury's senior citizens. The Ontario Housing Corporation plumped for the all-electric concept after an approach by Sudbury Hydro.

Marking the birth of the new city of Thunder Bay this month was a huge birthday cake built from colored lights and provided by Ontario Hydro. It was erected atop an arch on the boundary of the former cities of Fort William and Port Arthur.

A former manager of Woodstock PUC, Cecil E. Kirkby, died last month. Mr. Kirkby was born in Brantford and became superintendent of Brantford Township PUC. Between 1929 and 1951 he was manager of the former Stamford PUC, now part of Niagara Falls. He retired from the Woodstock utility in 1962.

Windsor Utilities Commission recently received offers from scrap metal dealers for 492 water meters. One dealer offered four cents a pound, another bid 41.09 cents a pound. No guesses as to which they accepted.

W. H. Chalmers, manager of Ontario Hydro's Kent area, will take over the management of the Erieau Hydro and Erie Beach systems in addition to his present duties. The two utilities were previously managed by Ontario Hydro consumer service supervisor William Ford. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Good employee relations are inseparable from good community relations, says the latest section of the handbook "Public Relations for Hydro Utilities". Trying to build an effective community relations program without first enlisting employee support and enthusiasm can be an expensive waste of time, effort and money.

It is the municipal utility's responsibility to supply an essential service to the community. In so doing, the utility is dependent on those employees who greet and deal with the customer for its success in the community. "The clerical staff are the front door to your utility," said one PUC executive during a discussion on the subject.

Actions in employee relations must lend credibility to words. Put another way, employers must demonstrate that they mean what they say.

Entitled "The attitude of your employee," the section also discusses the manager's role, suggestion plans, communication techniques and ways to improve morale. It has been distributed to each electrical utility office in Ontario.

\* \* \*

"Mommy, why are the street lights on in the daytime?" The question may have been asked many times, but when it was asked by the child of a North Bay Hydro employee, it fell on interested ears.

The employee repeated the question to her supervisor, and the idea for an explanatory advertisement was born. Working in co-operation with the daily newspaper — the North Bay Nugget — the local utility developed an ad to explain its policy. The main reason, of course, is to save money by patrolling and replacing lamps during normal working hours rather than pay overtime wages to carry out the inspection.

The Nugget's news desk also took an interest in the project and printed a three-column story on the daytime street lights. It's a sort of modern day version of the parable about hiding your light under a bushel.

\* \* \*

Community newspapers have shown quite an interest in PUC activities, judging from some other stories that have appeared in the last few months. Three stories in particular demonstrate a sort of subject that is of interest to newspapers and their readers.

Huntsville PUC was featured in a story in the Huntsville Forester which reported on a study of the utility's needs in 1990. The survey took into account the possibility of an increased area to be serviced and the recommended program of enlargement and expansion.

The Scarboro Mirror interviewed a 43-year veteran of Scarboro PUC's line staff, who reminisced about construction and service problems in the early days. Interspersed with nostalgia about teams of horses and 20-foot snowdrifts were current examples of how PUC service and techniques have kept pace with new methods and technology.

The Oshawa Journal took a different approach when it reviewed the variety of electrical applications available to customers of Oshawa PUC. This led into an explanation of the distribution system and the rate structure, often a mystery to the layman. Even plans for expansion and the higher costs of underground distribution were discussed in the story, entitled "Picture a day without Hydro".





January is the month when we customarily (and accurately) forecast the most significant developments of an electrical nature as they will unfold in the year ahead. And, quite frankly, it's been something of a snap. Inveterate prognosticators such as ourselves scarcely raise a sweat in stripping the veils of uncertainty from the immediate future.

But this is the beginning of a new decade and even the best of us can strain an eyeball in looking that far ahead. Fortunately, in a crystal ball otherwise enshrouded in vapors and clouds, we can discern the initials ESB standing out with some clarity – suggesting to the experienced soothsayer that nothing else really matters.

And what, the uninitiated may ask, is so all-fired significant about ESB? Well, for one thing it will get away with the need for LSD, pot, speed, acid and all the other methods of transportation currently coming into common use. For another, it will render obsolete a wide range of activities formerly considered important to human welfare including sleep, sex and labor relations.

Electronic Stimulation of the Brain is very definitely shaping up as the "Mr. Big" of the all-electric 70s. For best results, people will be advised to have their brains wired early. Once hooked up, an individual becomes a robot and will carry out any number of mundane tasks willingly and happily. If ditch-digging is the order of the day, he will have at it with gusto and love every moment just as if the whole thing was his idea in the first place.

We'll all be living in an office manager's paradise. Such frivolities as incentive programs, collective bargaining and annual vacations will be a thing of the past and those with their buttons set for the work position will be hard to chase home at the five o'clock whistle.

But there will also be plenty of time for fun and games. Dream machines for every home are a distinct possibility. With one of these home fun centres, one simply dials the experience one desires, whether it's surfing off Hawaii or reading poetry with the current sex symbol.

Scientists explain that the pleasures induced by stimulating the appropriate sections of the brain seem to transcend those associated with mere food, drink or sex and result in a sort of super-euphoria. Rats wired in such a way as to permit them to control the switch turned themselves on hundreds of times per hour, 24

hours a day, taking only the briefest of ratnaps, seconds for food and spurning conventional sex entirely.

Everything seems to indicate that humans will be equally titillated and we can look forward to the day when the lowliest pauper among us will travel the world from his living room and cavort with concubines and kings.

Like it says in the crystal ball – what else matters?

■ Hydro has been catching it in the neck of late for discharging warm water from its thermal-electric plants into the Great Lakes system, but it now looks as if the commission has done more cooling over the years than heating. And right now things are pretty well in balance – give or take a BTU or two.

One enterprising slide-rule virtuoso apparently got to thinking about things like friction and kinetic energy and came up with some interesting conclusions.

It has been generally assumed, he points out, that water passing through penstocks at hydro-electric stations emerges unchanged just as if it were still heaving and tossing its way over the rocks and cliffs of yesteryear. Not so, says our mathematical maestro, and through some fancy footwork with physics he proceeds to show how the penstocks of hydraulic plants actually have the effect of extracting large volumes of heat from the water.

Getting down to the nuts and bolts of the thing, he figures that in 1968 Hydro pumped  $7.83 \times 10^{13}$  British thermal units into the Great Lakes from its thermal-electric stations. This is a fair amount of heat, but it hasn't been all give and no take. During the same year, he reckons, hydro-electric plants on the upper St. Lawrence system extracted about  $7.85 \times 10^{13}$  BTUs from the water. This leaves Hydro with a small balance in its BTU bank account and suggests that a line of credit should be extended on the basis of its contributions to air conditioning in the province before the advent of thermal stations.

■ Another esoteric line of reasoning suggests that nobody would have the audacity to squawk about Hydro bills if they paused to consider the ancillary benefits provided by their electrical appliances in terms of home heating. According to this hypothesis, about 50 per cent of the electric energy consumed in the home for lighting, cooking, washing, refrigeration and the like is converted to heat which contributes to keeping the house warm. The rest is exhausted outdoors by dryers and down the drain in the form of hot water.

Let us assume that the average household consumes somewhere in the neighborhood of 600 kilowatt-hours of electricity per cold month. Ipso facto (Italian for it's a fact) over a nine-month heating season we have 2,700 kilowatt-hours of nice clean electricity pitching in with the heating job for which gas or oil gets all the credit. Subtract this from your electrical bill and you've really got a bargain.

That's the way it was explained to us and we claim no copyright. Slide-rule jockeys and gas company salesmen who find flaws in our reasoning are advised to contact their local ombudsmen – we have no fixed address.

■ According to Hydro statistics, about 450,000 people in the province went to bed with Herbert B.

Khaury and his bride just before Christmas and the resulting commotion was enough to shake the system to its very cycles.

Electrical demands registered about 150,000 kilowatts above normal during the early morning nuptials and when the two protagonists left the stage and headed for their just reward, the viewers apparently joined them. Not in the same bed, we hasten to add, but the sudden closing down of lights and TV sets across the province was enough to affect system frequency.

The long-haired Herbert is also known as Tiny Tim and the increase in normal demand occasioned by his matrimonial caper about equaled the combined peak loads of Belleville, North Bay and Peterborough.

People are funny. Fancy staying up late just to watch a minister commit hairy Khaury.

■ One of the more promising developments in the bid to reduce the incidence of ulcers and coronary thrombosis among top-level management is the appearance of the executive sandbox.

No toys, these man-sized playpens cost \$500 each and are advertised as "essential fittings for the executive suite" and "an excellent pacifier for the overstressed businessman."

The theory is that an up-tight vice-president can avoid both the psychologist's couch and the surgeon's knife by stripping down to his jockey shorts and leaping into the sandpit.

Judging by the dimensions of the thing (42" x 42" x 15") the boss could spread the benefits by inviting, say, the marketing manager and chief engineer in for a mudpie or two. Room might even be found for four if shorthand were deemed necessary. She should bring her own pail and shovel.

Come to think of it, all that sand would come in mighty handy for birds such as ourselves with a penchant for hiding the head when too hotly beset by the facts.

■ Strange goings-on are reported from England in the meter reading sphere. According to one newspaper account, influenza was so widespread among meter readers in the Hereford district that the electrical authorities were obliged to write to customers advising them that their next bills would have to be based on estimated consumption. In a footnote, the report observed: "Gas meter readers have not been affected by flu."

Competition is stiff enough over here, but so far even the gas people have drawn the line at germ warfare.

■ Reports have also been received of monkey-shines among other meter readers in Western England.

Confounded by the wild swings in electrical demand from a nudist camp, the local electrical board launched an inquiry. Investigation revealed that the regular meter reader had been turning a small profit by renting his cap and badge to friends. Electrified by the sights, no doubt, the amateurs had been jotting down the wrong figures. They were, in effect, done in by their digits.

■ Among the millions of pollution experts who have been sounding off of late, one from California stands out for the simplicity of his approach. People are the problem, he sagely observes, and he's calling for a reduction in world population.

Any volunteers?





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Someone scrambled up a power pole to rescue a cat.

He'll never know the lights went out.

Remember

Ontario Hydro and the municipal utilities

are interested in YOUR safety.



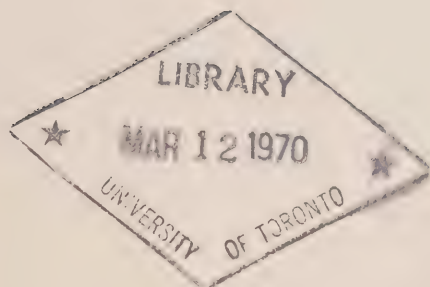
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- the master's touch
- the house on may street
- computer for the mini set

# ontario hydro news

february/1970







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### the cover

A. Y. Jackson, last surviving member of the Group of Seven artists, greets young admirers at the McMichael gallery at Kleinburg that is now his home. More about the gallery and Mr. Jackson on page eight.

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## Viewpoint

# bridging the gap

One of the big problems in Canada today is the fact that we are divided into two main camps by virtue of our language and cultural backgrounds.

Less evident, perhaps, but as potentially disastrous is the gap opening up between two other cultural factions – the scientific society and the non-technical majority.

International in scope, the problem was skilfully spelled out in a talk by H. G. Slater, of the Niagara Mohawk Power Corporation, at a recent nuclear conference at Pickering generating station. "The tragic fact is," he explained, "that the public at large – the young, housewives, artists, teachers, social scientists and small businessmen – have a basic fear of all advanced technology that they don't understand and a distrust of the people who do."

Much the same psychology is to be found in our day-to-day relationships with auto mechanics and television repairmen. To the great majority, the technicolored spaghetti behind the video tube is as meaningless as the heat riser valve on the family Ferrari, and very few of us are prepared to narrow the information gap.

Even in these instances, where all we can lose is our money, the tendency is to regard the expert as a kind of bandit who, if the truth were to be revealed, rightly belongs behind bars.

Incomprehension, whether on the part of the university professor, the politician or the man on the street gives rise to opposition and a stubborn refusal to deal with vital problems on a rational and enlightened basis.

As Mr. Slater so aptly put it: "A housewife does not need to understand nuclear fission in order for her to perform her chores or for utilities to operate their plants. But when she and thousands like her begin believing that a technology is a serious hazard, the industry is in trouble – because, more and more, decisions involving major industrial activities are being determined by public opinion."

The cultural gap threatens progress in two directions. Lacking even the most rudimentary understanding of scientific principles, the public can fail to perform its function as a checkrein on scientific misadventure or it can effectively block developments of the utmost importance to our ultimate welfare.

Technology cannot benefit man unless it is applied. And it cannot be applied without public consent. Lack of public understanding inhibits evaluation of the past, judgment of the present and hope for the future.

Unfortunately, there is little to indicate that the public intends to resolve the problem by increasing its grasp of technological affairs. The onus appears to be on the scientific side of our bi-cultural society to provide both the technological expertise and the communication.

In other words, our biologists, physicists and engineers will be doing only half their job, and perhaps the least important half, if they stick exclusively to the narrowest confines of their disciplines. After all, most lines of scientific endeavor carry environmental overtones. □



# real charge from the not-so-humble battery

by Hal O'Neil

A small recorder, attached to a transmission line north of Toronto, takes a two-second reading of the line's gyrations in the wind. It's powered by batteries, but sophisticated ones as dissimilar to the flashlight variety as an ox cart to Apollo 12.

The batteries look to the sun to keep their charge for weeks on end. Even a few hours of sunlight each month are enough to keep the tiny instrument faithfully gathering data 97 times a day. The information is proving valuable to engineers studying the phenomenon known as galloping — destructive vibrations of conductors caused by wind and ice.

Incorporating plates of silicon oxide to convert solar into electrical energy, the cells of the system are an example of

the present revolution in "packaged" power, which scientists estimate has improved performance 400 per cent.

There's nothing new about batteries — Alessandro Volta constructed the first practical one in 1799. But they didn't come into their own until the 20th century. Rather simple devices in principle, batteries are more correctly called cells. But since there are always two or more in any power unit, the word battery is a more appropriate description.

Batteries convert chemical energy into electrical energy. There are two types — primary or dry batteries, which give only one continuous charge, and secondary batteries, which may be recharged by



*Battery-powered cars are nothing new, as this Rauch and Lang, photographed around 1917, proves.*

reversing the flow of direct current back into the cell. With either type, cells may be connected in series, parallel, or series-parallel to provide specific voltages and currents.

There are five basic parts to a battery cell whether it's the common or garden variety or space-oriented: anode, cathode, electrolyte, separator and seal. The electrolyte permits the flow of ions from cathode to anode. The separator is an inert porous medium that physically keeps the two poles apart while permitting the ionic flow. A seal simply prevents loss of electrolyte and water while permitting gas to escape.

Most people are familiar with the zinc-paste-carbon dry cell and the lead-acid accumulator, both of which have been around for half a century. But modern technology, whether in space, ground transportation, medicine or simply because of a consumer's yen for a more portable radio, calls for more power from less weight for a longer period.

Today, there are battery-powered transistor radios no bigger than a pack of cigarettes; there are hearing aids so small the entire unit, including the battery, disappears into the ear. Small pieces of jewellery with built-in lights run on batteries scarcely larger than a sequin. The Ontario Department of Lands and Forests has attached miniature, battery-powered radio transmitters to wolves to study their habits. There are portable paging units, cordless tape recorders, toys, shavers and clocks. In short, wherever there is a need for portable power, there would seem to be a battery for the job.

The qualities of high power, low weight and long life are particularly important in the US space program. Nickel-cadmium rechargeable batteries, for instance, provided the basic power supply for the two Apollo mission LEM vehicles from which man made his first moon walks. Similar batteries are now replacing the old dry cells in high quality tape recorders and radios here on earth.

In space applications, the number of times a battery can recycle is most important. Space power systems are designed for an orbiting body which picks up energy from the sun through dozens of tiny silicon or selenium photo-electric cells, just as in the transmission line recorder.



The electric output of these cells is stored in a battery, to be used when the vehicle is on the dark side of a planetary body. In a single mission, a battery of this type is discharged and charged as many as 100 times.

The Astropower Laboratory run by NASA prime contractor Douglas Aircraft is now making batteries of zinc and silver. Several such cells backed up the nickel-cadmium storage cells on the moon flights. The zinc anode and silver cathode are separated by an electrolyte of potassium hydroxide.

The superiority of such a sophisticated space battery over the zinc-carbon type is impressive. It delivers from 35 to 50 watt-hours (the equivalent of one watt of power for one hour) for each pound of total battery weight. The ordinary automotive battery delivers only 15 to 18. Furthermore, it can be charged and discharged hundreds of times, even at operating temperatures as high as boiling water. The nickel-cadmium cell, on the other hand, doesn't like heat and won't recharge if more than 30 per cent of its electrical potential is exhausted.

Such elegant batteries for space use may soon be brought down to earth if, as many scientists predict, electric power becomes the dominant means of propulsion for automobiles. George Hoffman,

of the University of California, says that "investigation suggests that a totally pollution-free vehicle is needed by the beginning of the 21st century." He also says that "electric traction energy is cheaper by one-half to one-quarter than the equivalent gasoline combustion energy."

So far, though, manufacturers who have experimented with various versions of the electric car have not succeeded in overcoming the biggest problem — developing a lightweight power source that would give good mileage without frequent recharging. In short, the electric car can't yet match the performance of the internal combustion engine.

But things are looking up. The US Federal Power Commission, in a recent report, said that the electric car will find a suitable market by 1985 as an urban delivery vehicle and runabout. Developments in electrochemical power sources (batteries and fuel cells) along with advances in the design and efficiency of electric motors add further support to an optimistic viewing of the future of the electric car.

The power industry looks hopefully at this development. A team of Detroit Edison engineers told the Society of Automotive Engineers last year that "the electrical industry may find itself the source of power for recharging secondary batteries for electric vehicle propulsion and the provider of energy for the production of fuel cells."

A fuel cell is a device which converts the energy of a reaction between two



chemicals into electrical energy. It differs from the storage battery in that the reactants are fed to the electrodes from separate tanks only when current is needed, thus it is capable of sustained performance so long as it is refuelled. Many experts regard it as simply an open-end battery." Electric power is often required to make the special fuels.

Finding a practical battery that can store cheap electrical energy within a minimum of mass, and release it at widely varying rates depending upon whether the vehicle is idling at a red light, climbing a grade or passing on a freeway is the problem. The US Army, for one, is trying to solve it by using a hybrid system. The Army's idea is to use a stack of components — alternating fuel cells which chemically "burn" a liquid fuel to produce electricity and storage cells to accumulate the energy produced.

Their prototype is typical of the experimental high-performance batteries being developed in a number of laboratories. It employs an anode of lithium, much more active metal than, say, zinc. On the other hand, it is more corrosive and requires sophisticated packaging. The electrolyte consists of molten salt instead of a cold paste, and an ingenious design of the power stack uses excess heat from the fuel cells to keep the battery hot enough to operate.

A similar power system is now being investigated by the Ferranti-Packard Company in Toronto as a possible source of power for Canada's remote microwave outposts and pipeline pumping stations.

In assessing the relative characteristics of any battery system, two criteria are used — energy density and power density. Energy density determines the battery's energy storage capacity and is expressed in watt-hours per pound. It usually varies according to the rate of discharge, and falls as heavier loads are placed on the battery.

Power density refers to the rate at which power may be drawn from the battery, or the length of time for which a particular rate of discharge can be maintained. Power density in an automobile is especially pertinent in relation to acceleration, hill climbing, and sustained high speed.

The silver-zinc battery in use in space shows promise in earthbound propulsion. It has the highest energy density yet achieved, plus good power density. Its

practical energy density in applied engineering tests ranges between 50 and 55 watt-hours per pound. Used in an experimental Renault Dauphine by the Yardney Electric Corporation, the silver-zinc battery system (which weighed 200 pounds or about one-eighth of the car's body weight) gave a range of about 80 miles between charges and a maximum speed of 55 mph. There are, however, two flies in the ointment — the silver content makes the battery costly and it has a low cycle-life with only between 200 and 300 recharges practical.

Myriad other chemical combinations are under study by electrical companies, research groups and the automotive manufacturers. Included are sodium-sulphur, lithium-chloride, lithium-fluoride and zinc-air mixtures. Even the old lead-acid battery is not dead. Recently, an improved version was developed and tested by Electric Fuel Propulsion, Inc. In a converted Renault, the system displayed a range of 100 miles between full recharges under highway driving conditions.

And in other applications of the lead-acid battery, Bell Telephone Laboratories, in the US, is developing a cylindrical design which actually improves its performance during its lifetime. It is intended for emergency use should commercial power sources fail. The new battery has an expected life-span of 30 years. In normal rectangular batteries, the lead grids stand side by side like books on a shelf. Corrosion causes the grid lattice to enlarge and separate from the energizing material, causing loss of electrical contact and cutting battery performance. In the new battery the grids, consisting of a series of concentric circles connected by radial spokes, are cupped to a 10-degree angle and are stacked, pancake fashion. Their growth is controlled so that each increases in diameter at exactly the same rate, keeping the distance between the rings constant and keeping the rings and energizing paste intact.

It seems a long way from large batteries required for automobiles and other commercial applications to the tiny power sources needed by medical science for artificial heart valves, pace-makers and other implants. But the development problems are similar and the requirements for long life and dependability even greater.

Several thousand North Americans are now walking around with electronic pacemakers, which stimulate the proper rhythm of the heart beat, implanted in cardiac muscle tissue. These devices are

powered with button-sized mercury primary cells, similar to those used in miniature transistor radios. While such batteries have a theoretical five-year working life, doctors are finding that in the human body they give out after about 20 months requiring a delicate operation to replace them.

One idea would be to replace these mercury batteries with secondary cells which could be recharged by "broadcasting" an electric charge into them through induction coils. Early experiments in this direction have resulted in tissue damage between the battery and the charger, but recent refinements in this technique at the University of Rochester, New York, offer hope.

Another solution, suggested by J. J. Konikoff, a General Electric biological engineer, would be to implant a tiny generator activated by the pumping action of the heart itself.

The latest in battery miniaturization is the "electristor", developed by Daniel A. Speers, of Danecho Research and Development Labs in the US. Basically, it uses a layer of electron-emitting material such as strontium-90 embedded in silicon or germanium transistor material. This emission "joggles" the surplus electrons in the transistor material in a one-directional sense, so that a current of electricity is maintained. The current is sufficient to activate the transistor.

The device is still in the experimental stage, and has so far produced only milliwatts of power. Further, the idea of putting something as hazardous as strontium-90 into the human body might well give physicians pause for thought. However, the concept shows the diversity and resourcefulness of the new technology.

While there's always the possibility that miniature and highly efficient power plants may ultimately put the electrical utilities out of business, all indications point to the present centralized system of large-scale power production as being the most efficient and economical as far as the crystal ball can see.

Hydro, it seems, will be in business for a long time to come. □







# dry out or else

by Paul Christolm

**Sounds harsh,  
doesn't it?**

**But there's good reason  
to believe that an  
alcoholic is more likely  
to take and respond  
to treatment if he  
knows his job is on  
the line.**

Almost since the beginning of civilization, man has wrestled with the problem of excessive drinking. Attempts to regulate it were made as early as 2225 B.C. in the oldest-known code of laws established in ancient Babylon, while China's first unsuccessful experiment with prohibition pre-dated North America's by 3,000 years.

More recently, Sweden experimented with compulsory doses of a chemical which, in combination with alcohol, produces extreme nausea. Similar tablets are used in Canada for the treatment of



certain cases of problem drinking and alcoholism. France even made a half-hearted attempt to elevate milk to the status of a national drink.

Despite these and other measures, alcoholism's unrelenting swath of broken families, shattered careers, illness and personal degradation remains a number one social problem. But recent thinking by the medical profession and industry that defines alcoholism as an illness rather than a personal inadequacy offers new hope to the problem drinker.

In line with this attitude, a pilot rehabilitation program launched quietly in Ontario a year ago provides a gentle arm-twisting that may be one answer to excessive elbow-bending. Ontario Hydro is one of nine major corporations taking part in the project, which utilizes a "constructive coercion" approach on the premise that rehabilitation of the bottle-hooked employee is more likely to succeed if he or she is *compelled* to take treatment.

"Enlightened companies are increasingly realizing that the firing of alcoholics is skirting the whole problem," says Ivan Eaton, who is directing the project for the Addiction Research Foundation of Ontario, the sponsoring body. "In contrast to the popular skid-row image, more than half the estimated 120,000 alcoholics in Ontario are fully employed. The company that doesn't recognize that around three per cent of its employees have drinking problems is simply not facing up to reality."

Hydro and the other organizations taking part in the project — Bell Canada, Union Carbide, International Business Machines, Gulf Oil, The T. Eaton Co., Canadian Kodak, Imperial Oil and the Ontario government — concede this percentage as realistic. In Hydro's case it means that of 22,000 employees, about 600 have drinking problems of varying degrees.

"Like any other illness, early detection is a key factor in treating alcoholism," says

Dr. D. K. Grant, head of Hydro's medical services. "Supervisors must learn to spot signs of deterioration in performance on the job and determine whether these may be due to problem drinking. Early identification before the individual reaches the critical stage is one of the most important aspects of the program." Supervisors are not expected to make a medical diagnosis, but initiate the rehabilitation process by confronting the employee with the fact that his or her job performance is slipping. If a drinking problem is suspected, the employee is referred to medical services for mandatory assessment.

"The employee-patient suffering from alcoholism receives a balance of kindness and firmness," says Dr. Grant. "He is told that his job is in jeopardy unless satisfactory performance is regained. At the same time, Hydro is fully behind him in his efforts to recover — provided the employee will squarely face the problem and is prepared to take treatment."

Patients are referred to the foundation's centre, a stately old mansion in Toronto's Rosedale area, and during treatment are allowed to use sick leave and remain on their company's payroll. This, of course, is conditional upon the employee cooperating fully with prescribed treatment.

The centre, with imposing columned entrance, fireplaces and rich mahogany finish, includes seven single rooms, a four-bed ward, expansive dining room complete with chandelier, lounges, library and recreation rooms. It was formerly a diplomat's residence and more recently a private psychiatric hospital. The centre was bought by the province-sponsored foundation last July for \$300,000.

"The beautiful setting is all part of the treatment," says Mr. Eaton. "We strive

to maintain a home-like, rather than an institutional, atmosphere."

Some patients need only day care and return home each night. Others, who need to be away from their job and family, are residential patients.

There is no set treatment pattern at the centre, but the staff — comprising social workers, two psychiatrists, a psychologist, two public health nurses, an occupational therapist and three registered nurses — regularly sit down together to pool their knowledge in determining the counselling and rehabilitation approach for each patient, and reporting on progress.

"No two cases are alike," explains Mr. Eaton, "but most patients have had their illness from five to 20 years before detection. Problems are frequently associated with family or financial difficulties, but each person works and lives under different stresses. The one thing in common is that for one reason or another, all are physically dependent on the presence of a potent chemical called alcohol in their systems, or have developed a psychological need for its anaesthetic effect.

"While we refrain from preaching, we firmly point out to each new patient that once a person is in the grip of compulsive drinking, a point of no return has been passed. The future is either total abstinence or progressive deterioration.

"One thing the alcoholic cannot do is drink less. Patients are urged to drop pretences and tackle the problem honestly. We are in constant liaison with the patient's supervisor and personnel department, his family and both corporation and family doctors. We point out that all are part of the same team working for his recovery."

Physical training equipment at the centre helps restore patients to better health. Social and recreational activities, occupational therapy projects including wood and leather work, art and music and psychotherapy are not only for the patient's benefit, but assist the staff in



treatment centre for industry's  
problem drinkers is this stately  
mansion in Toronto's  
Rosedale area.



their understanding of each individual,  
personality and inter-relationship  
with others.

group therapy sessions, frequently  
with members of the patients' families  
taking part, proceedings may be videotaped  
and relayed to trained observers over  
closed-circuit television. This is an im-  
portant training and therapeutic procedure,  
but in all cases patients must give their  
consent before any taping is done. Because  
of the importance of early detection and  
the need for training managers and  
supervisors, regular seminars are  
conducted at the centre for supervisors  
and personnel representatives from  
participating companies.

As Mr. Eaton: "The project is too new  
to make any wild claims of success, but  
there is evidence from other research to

suggest that rehabilitation rates are much  
higher where industry has adopted a firm  
but supportive position. Experience has  
shown that voluntary patients drop out of  
treatment more frequently and earlier than  
those referred under constructive coercion."

From research and extensive follow-up,  
the Addiction Research Foundation hopes  
to show industry and the community  
that, with early pooling of resources, the  
problem drinker can be stopped in the  
descent to unemployment and, perhaps,  
the gutter.

"If our results are as good as we believe  
they will be, our experience will be  
invaluable in guiding other communities  
in the province in establishing this type of  
service with the use of existing  
facilities," Mr. Eaton adds.

And Hydro's direct stake in rehabilitating  
the employee with a drinking problem?

"If you lose a good employee through  
alcoholism or any other personal  
problem, nobody gains," says Dr. Grant.  
"Before the illness is detected, Hydro has  
frequently invested heavily in the  
long-term employee.

"Looked at in a strict business sense,  
the alternative is finding a replacement.  
It is much better to get the employee  
back on the rails, as the savings in  
experience and knowledge alone make  
rehabilitation good sense.

"Hydro, like all good companies, has  
accepted responsibilities for the health  
and welfare of its employees. Detecting  
alcoholism in one is no different from  
detecting, say, diabetes in another. It  
would be equally heartless to fire either.  
But we insist that both have a  
responsibility to themselves, their  
families and their employer to take  
treatment.

"Until the foundation's program was  
launched, there was no centre where we  
in industry could refer problem drinking  
employees," adds Dr. Grant. "Hospitals  
and private doctors are hard-pressed to  
cope with this type of illness adequately."

All companies in the project find that  
alcoholism sweeps right across the  
payroll. Hydro's cases have included  
laborers, clerks, engineers and section  
heads, right up to the lower levels of  
senior management. If not on sick leave,  
employees from communities outside  
Toronto are given a temporary job which  
allows them to live in the city.

Of 28 Hydro employees referred to the  
centre so far, only one has been dismissed  
for refusing to take treatment. Job  
suspensions have been imposed in two  
instances where employees have gone  
back on the bottle after treatment.

"It takes 20 to 30 years for alcoholism  
to develop as an illness," says Dr. Grant.  
"One might expect that some patients  
may stumble and regress once or twice  
before their dependency is relieved." □



Artist A. Y. Jackson, seen with his nurse, makes his home at the rambling McMichael gallery at Kleinburg. Most of the paintings are by the Group of Seven, of which Mr. Jackson is the last surviving member.

# ART FOR ART'S SAKE

by Sue Goldenberg



Photos by Ron Brown

If anyone knows the value of money, it's Robert and Signe McMichael. While they've amassed considerable wealth through shrewd business dealings, they're using it to bring pleasure to thousands by preserving part of Canada's cultural heritage.

Their \$2½ million collection of Canadian art consists of more than 500 paintings and Eskimo and Indian carvings. It is kept right in their home at Kleinburg, overlooking the Humber River, but it was opened to the public free of charge four years ago when the McMichaels gave it to the province.

In 1966, about 30,000 visitors toured the gallery. Last year, attendance soared to 84,000. Under their agreement with the province, the McMichaels act as unpaid curators.

Yet the whole thing started almost by accident. The McMichaels found their original 10 acres — it's now part of a 600-acre Metropolitan Toronto conservation area — in 1952 when a friend tipped them off about a farm for sale near Kleinburg.

"An elderly couple were living on it and wanted to move because their barn had burned down," Mr. McMichael recalls. "They offered us the roadside land, which would have been a good investment. Even when we told them we wanted a wooded hillside near a river, they said they had some scrubland at the back they used for pasture."

Similarly, it was almost by accident that Robert McMichael, an unassuming, friendly man in his forties, made his fortune. He was working as a wedding photographer in Toronto when he hit upon the idea





ing promotional sample products to  
e bride. Firms willing to pay a small  
ce for the inclusion of their items in his  
ridal Shower" propelled the idea into  
multi-million dollar firm.

e McMichaels started their collection,  
minated by the Group of Seven artists, in  
odest way in 1953 with a Lawren  
ris sketch, "Montreal River, Algoma."  
en years later, by saving every possible  
lar, they had bought nearly 50 canvases  
l sketches which form the nucleus of  
present collection.

In 1965 when the collection was given  
to Ontario, it had grown to include more  
than 200 works.

The McMichaels' home, "Tapawingo"  
(Indian for "place of joy"), was designed  
by them after "lots of reading and looking."  
A. Y. Jackson, a founding member of  
the Group of Seven, lives with them and  
signs autographs for visitors. Its simple,  
early pioneer beauty masks many ingenious  
construction ideas and blends in unob-  
trusively with the bold beauty of the  
paintings. As visitors walk through, they  
can gaze out at a broad expanse of pine

trees from the large glass windows which  
extend the full length of a wall.

To give their home its early pioneer flavor,  
the McMichaels used pine logs collected  
from dismantled homes in the Kleinburg  
area for its exterior. The inside walls are  
made of barnboards or logs while the floors  
are hand-pegged oak. Pioneer artifacts  
decorate the walls above the paintings  
in their living room. The McMichaels  
paid less than \$5 for some of these items  
now so popular among home decorators.



About 84,000 visitors toured the McMichael gallery last year. Centre photo shows Robert and Signe McMichael. Right, A. Y. Jackson talks to young students.



finding many of them lying unused in the old buildings they bought for barn-boards.

The McMichaels are now building a new wing, due to be completed in June or July, which will contain 12 more galleries, all larger than the present 15.

"We burned our brains not to do either of two easy things — build something entirely new or repeat ourselves absolutely," Mr. McMichael explains. "And we also wanted to avoid the terribly easy temptation to be cute or corny. It's important to use restraint as well as initiative."

To retain continuity on the outside and prevent the jarring difference often seen in today's architecture between the original and the addition, the McMichaels used natural fieldstone and logs. However, the size of the building — it is built in three levels, all above ground — dictated larger logs than those found in Ontario. As a result, they used massive douglas firs from British Columbia. The staff hand-hewed them on the spot in the same manner as their pioneer forebears.

Instead of repeating their categorization of galleries according to painter, the McMichaels are planning the new ones by theme. The biggest one, at 3,200 square feet, will be the West Coast room and will contain paintings done out there by the Group of Seven artists and Emily Carr. In addition, there'll be a huge totem pole while mythological carvings by the Haida Indians will serve as archways. Other rooms will be dedicated to Quebec, the Prairies and the Maritimes.

The McMichaels employed just as much ingenuity in installing the services to run





lery. Because telephone and hydro  
les would have clashed with the tran-  
ility of the architecture, these services  
e supplied by underground cable.  
originally, the McMichaels used pots of  
t water to prevent their barn-like ceiling  
m siphoning off the humidity necessary  
the paintings. Then they decided to  
ress the excess humidity from their  
imming pool.

ctric heat is used because it is clean,  
es less moisture from the air and also

because it dispenses with unsightly  
ductwork or piping.

The McMichaels experimented with several  
types of lighting, using metal, papier-  
mâché and wood facsimiles to develop  
their own design. Similar to a floodlight,  
but at a much lower 50-watt intensity,  
the lamps are housed in versatile cone-  
shaped containers.

They can be attached directly to the  
ceilings or to swivel rods nailed on the  
walls or rafters. If a painting contains dark,  
heavy colors that soak up light like  
blotters, a number of lights are focussed

on it. Small sketches require only one  
light.

In addition, the heavy concentration of  
lighting serves a dual purpose, bouncing off  
the walls to provide sufficient light in the  
gallery corridors while not detracting  
from their cosy, warm atmosphere.

Says Mr. McMichael: "Living in the  
gallery has helped us to be conscious of  
what will work far more than if we just  
came in between 9 and 5." He couldn't be  
more correct. |



# destination nowhere!

by Rae Hopkins





the Rock Island Line's mighty line.

Neither the old railway station in Paris, Ont., nor the one in Listowel is connected with any railroad — they're both out unusual stations in the Hydro organization. They both still look like railway passenger terminals and, says Karm Ellis, who works at Paris, they had a little old-fashioned ruin in not too long ago in a hurry get a ticket for Toronto.

And to add just a little more to the confusion, the one in Paris is the Brantford area office.

Built around 1915 by the old Lake Erie and Northern Railway, the Paris station (below and bottom left) was used by passengers travelling south to Port Dover, then a thriving commercial fishing village, and north to Galt where there were connections to the main Toronto line.

That was back in the days when passenger service was booming and the coaches were nearly always filled. The last passenger train snugged out of Paris in 1951 and now only freight trains pass by hauling their bulky cargoes of gravel from nearby quarries.

Two decades on the mainline, the station is the disused railway station (top left) built around 1908, which now houses Hydro's Listowel area office.

Originally constructed as a CPR spur line terminal for connecting trains to Goderich, Guelph and Toronto, the last passenger train steamed away from Listowel station shortly before the dawn of World War II. Now only the occasional freight train rolls by to service a nearby lumber yard.

But, say the people who work there, it's still noisy enough when the "cannonball" goes through — there's a crossing right there that necessitates a few loud blasts from the diesel's whistle. At Brantford, there's even more noise. A slight curve in the tracks produces a sort of eerie screech from the big steel wheels.

But the people who work there just shrug it off, close the windows and return to the routine of providing electrical service to rural Ontario. □







# mini utilities with the maxi look

by Jim Etherington



As well as managing Bothwell Hydro and Alvinston PUC, Gordon McDonald is meter reader and lineman for the two utilities. But when it comes to billing, most of the load is taken from his shoulders by a computer service offered by London PUC.

When it comes to size, the neighboring utilities of Alvinston and Bothwell hardly rank as giants. Manager Gordon McDonald is able to look after the electrical needs of both these small agricultural communities near London, Ontario – and act as meter reader, lineman and office clerk.

Bothwell Hydro and Alvinston PUC, with about 700 customers between them, have something in common with the most up-to-date utilities serving thousands of people. And that is access to a top-line computer for churning out their monthly bills.

Earlier this year, the two commissions agreed to let London PUC do their billing for them. "As a result, the London computer can run off in 12 minutes a job that used to take me three-and-a-half days," says Mr. McDonald. "We've had our problems, of course. You've got to have a thorough understanding of what's required to feed information into the computer. But gradually we're getting the bugs ironed out."

Bothwell and Alvinston are not the only utilities making use of London's IBM 360, Model 20. Billings are also being turned out for Ingersoll, Port Stanley, Aylmer, Alton and Strathroy. And Ridgetown PUC is talking seriously about the service.

It all began in late 1968 when London PUC decided that its computer – rented at a cost of \$4,000 a month – wasn't being kept busy enough. It was decided to devise a package program that could process the billings of area utilities. Ingersoll was the first approached and, after a period of trial and error, bills began popping out of the computer.

"Our existing billing machines needed replacing," says C. V. "Bud" MacLachlan, manager at Ingersoll. "We had actually budgeted for the machines when London asked us if we would be interested in using their computer. We did a couple of







streets this way and soon had the whole thing on their equipment."

Ingersoll was only the first of a string of customer utilities which the London officials feel could come from any part of Ontario. To take advantage of the data processing equipment, the smaller utilities generally need to overhaul their present systems. Many need to do it anyway, but haven't the time nor the personnel.

Charles Kew, secretary-treasurer of London PUC, says the plan benefits both sides. "Many municipalities may be using some sort of billing machinery, but find they either need more sophisticated equipment or are on the verge of getting their first such equipment. Our service is economical enough that it pays them to have us do their billing."

Mr. Kew says that sharing the London computer makes greater use of its potential. "Really, this kind of thing is a normal extension of the kind of co-operation you find among all utilities.

"We have the special equipment with time to spare on it, and are able to offer computer services at a lower rate than utilities could get anywhere else. So everyone benefits."

Altogether, the three-year-old computer system serves about 70,000 customers, 10,000 of them from communities surrounding London. Staff of the utilities taking the service do their own meter readings, then mark them with a special pencil on an IBM card. The cards are sent express to London on the last day of the month.

The London staff runs an extra shift and processes the cards at the rate of 3,000 an hour through the computer, getting them back to the utility within four days. The computer supplies the customer's bill with his name, mailing address, due date and account number, gross and net amounts and various other charges ranging from electricity and water readings to sewage charges and taxes.

The home utility also gets a billing register showing all the information pertinent to the customer, a consumption and revenue analysis, accounts receivable cards and a mark-sensed card for each customer's next meter reading.

Don Grace, manager of administrative services and data processing for London PUC, says that not only is the model 20 specifically designed for utility work, but the fact that it is being operated by a utility for other utilities makes the London plan the least expensive and most serviceable.

He says that high programming charges make it uneconomical for a small utility to use the services of a conventional computer service bureau.

"And even then, someone like ourselves can do a better job," he adds. "Being in the field we know the language, recognize its problems and know the cures faster and more accurately than any stranger to a utilities operation."

Mr. Grace says that London already had a computer program for its own use and consequently was able to offer it to others without developmental costs.

"Simplicity was top on the list of our priorities in developing this system," he says. "We set out to eliminate all computer jargon so that clerks in the small utility can handle the system."

London, when it signs up a new utility, makes it a point to bring in the clerks to the processing of their bills. This not only makes the whole procedure clearer but also helps with any problems which may arise.



*Bills from several neighboring utilities are now handled on the London PUC computer. The machine can run off in 12 minutes a job that used to take three-and-a-half days.*

Processing is a comparatively simple affair. The computer first is asked to merge the master name cards with the meter cards sent in by the utility. At this time, any credit and arrears cards are fed in as well. While merging is taking place, the computer examines each meter card and checks out those apparently improperly mark-sensed.

At this point that the computer notes any readings that have changed drastically, noting there might be an error someplace. Customers' bills and the billing register are printed simultaneously.

Customer reaction to the switch can only be described as great," says Mr. MacLachlan. "I think if we went back to the old system, people would think we were crazy. Not that we still don't have problems. There are a number of special customers whose billings just don't fit in so well, but we are working it out."

The cost of the London service to its customers is 15 cents a bill with a minimum charge of \$15 a billing. The home utility pays the cost of sending the readings to London, and London pays the cost of turning the bills, cards and reports. Initial cost of setting up the system is five cents a customer.

London will also – for 10 cents a bill – mail the bills back to the utility's customer with the only hint that it comes from London being the postmark. The utility's return address shows through the envelope window for normal payment.

"We get enough customers in a specific area we are thinking of providing some kind of car pick-up and delivery service," says Mr. Kew. "Actually, when you look at it, we could handle any utility in Ontario."

London PUC has already thought about various electronic means of transmitting data, including touch-tone telephones. It is ready to connect with member utilities should such devices become economical.

□





# toronto think-in

## **inflation hurts the old folk**

Inflation is hurting the dignity of utility pensioners, said delegates to the Ontario Municipal Electric Association's District 4 annual meeting in Toronto last month.

Close to 100 utility commissioners from Metropolitan Toronto and neighboring communities endorsed a North York Hydro resolution calling on the provincial association to "thoroughly investigate the inadequacy of pensions for former utility employees, now retired."

Said John Dunn, a North York commissioner: "We have a moral responsibility to our past employees, who through no fault of their own find themselves in inadequate circumstances, to ensure standards of living and human dignity are maintained."

He added that many retirees had given much of their lives to their employers.

The resolution stated that inflation, higher costs of living, and heavier tax burdens at all levels had resulted in pensioners no longer being able to maintain an adequate standard of living on their present pensions. It called for legislation permitting the boosting of pensions to "maintain an adequate standard of living commensurate with dignity".

As an alternative, an amendment to the Ontario Municipal Employees Retirement Act was proposed to enable municipalities and local boards to purchase supplementary pensions for retired employees at present not qualified to receive them.

While on the subject of pensions, the district executive also called on the OMEA to approach the "appropriate authorities" to petition for an amendment to the Canada Pension Plan which would exclude elected officials from premium payments.

J. L. Christie, vice-chairman of East York Hydro, claimed there was an inequity against elected officials. He said most elected officials already contributed to the plan from their main source of income.

Delegates also adopted a resolution asking the OMEA's power costing committee to consider a suggestion that reserves marked for stabilization of rates be maintained in a fund for that purpose only. It further called for the establishment of sep-

arate reserves for "the various other functions now protected by funds credited to the rate stabilization fund."

The resolution, submitted by East York Hydro, followed on the heels of an announcement by Ontario Hydro of an increase in interim rates. East York suggested a rate increase was hard to justify when it was public knowledge that a rate stabilization fund in the amount of \$183 million existed.

Mr. Christie said that "to the \$150-a-week worker, \$183 million is a lot of money." He called for a change in Ontario Hydro's bookkeeping procedures to eliminate such contingencies from the fund as self-insurance, foreign exchange rates, stream flow variations and others. These, he said, should be held under a separate reserve fund.

Mr. Dunn agreed that the rate stabilization fund was "a sensitive area" with the public right now, but argued Ontario Hydro must have a great deal of latitude in its operation of the fund. He added it wouldn't be too hard to justify a considerably larger increase in the rates now charged for electricity.

Ontario Hydro Chairman George Gathercole said a rate stabilization fund totalling close to \$200 million was not large in respect to the capital outlay Hydro would have to make this year. He said that would be in the order of \$504 million and "pretty soon will be about the \$750 million mark in a single year.

"We must have a great deal of flexibility in providing monies for, or withdrawing from, the rate stabilization fund. If we were to have a large economic slowdown, Ontario Hydro should be able to draw on the fund rather than burden the municipal utilities with a large thirteenth bill," Mr. Gathercole said.

And there was unhappiness about the manner in which the most recent rate increase was announced. A North York resolution called on the power costing committee to take up methods of announcing interim rate increases with Ontario Hydro.

Mr. Dunn said the press was aware of the rate hike before he was and that caused "somewhat of an embarrassing situation for a municipal utility commissioner."

However, Ontario Hydro's assistant gen-

eral manager — marketing, D. J. Gordon, explained that news of the increase was mailed to all utility commissioners on Friday night and it was intended to release the information to the news media the following Monday. He said what happened was that a commissioner picked up his mail at the post office on the Saturday morning, read the announcement and turned it over to the local newspaperman.

"That newspaperman just happened to be a stringer for one of the Toronto papers and boom, it was out," Mr. Gordon said.

Mr. Gathercole said Ontario Hydro would be pleased to consider other methods of rate announcements with the OMEA any time.

## **door still open on regions**

Panel moderator John MacBeth, of Etobicoke Hydro, urged delegates to make constructive recommendations to all regional government commissions "if we wish to keep the OMEA alive.

"All regional government reports appear to have left the door open for Hydro — they're looking for a consensus of opinion," Mr. MacBeth added. The panel also included John Irvine, secretary-treasurer of Etobicoke Hydro, E. Grant Bainbridge, Ontario Hydro's director of consumer services, and Andy Frame, a Burlington PUC commissioner.

Stressing the importance of co-ordinating action between Ontario Hydro and OMEA, Mr. Bainbridge said the provincial commission had created a regional government task force for continuing independent studies of the "many possibilities which can arise." He added that discussions already been initiated with the OMEA to present a united approach.

Already, Mr. Bainbridge said, a number of areas had been examined, one of which was the transfer of assets to new regional jurisdictions.

"Rates, too, have been considered. We're trying to determine what will happen in the amalgamations of utilities and so far we've concluded regional government participation won't change the policy on which rates will be applied.



utility executives from Metro Toronto and the surrounding area toss around some of the vital issues affecting the electric power industry today

"However," he added, "the basis on which assets are transferred will have an impact on rates."

From Murray Jones to Donald Steele, and Mr. Frame, was the story of regional government in Ontario. He said that "Jones said some pretty shattering words" in his Ottawa-Carleton study — one in which he called for abolishing all commissions and putting them under the municipal council as a committee.

"Steele (commissioner of the Hamilton-Wentworth regional government probe) says differently. He believes in electric commissions and has adopted the municipal utilities' submissions calling for Wentworth North and South Hydro commissions. So you can appreciate the OMEA has been very active in the Steele study.

"We've come a long way in getting regional government commissions to listen to us," Mr. Frame said. However, he cautioned, the "battle is a long way from being won yet. The rumor's out that the Report (Kitchener-Waterloo) will call for the elimination of committees and commissions. Darcy McKeough (Ontario's Minister of Municipal Affairs) is giving the OMEA a real opportunity to talk — it's up to us to see that we take advantage of that opportunity."

And, he said, be it Ottawa-Carleton, Peel-Elton, Muskoka, or Kitchener-Waterloo, there was a major problem confronting the municipal utilities — the acquisition of rural systems operated by Ontario Hydro. He suggested there could be an undue financial burden placed upon consumers in the transfer of assets — which is a new one to me."

Mr. Irvine complained about financial problems encountered by the municipal utilities in purchasing lines from Ontario Hydro. He said the provincial commission shouldn't allow for previous equity in a line when selling to the municipal commission. "That's like paying off a mortgage then assuming monthly payments — and a Scotsman like myself won't do it," he said.

Reviewing Ontario Hydro's operations for the year, Chairman George Gathercole said the commission met the year's peak demand with a "somewhat more comfortable margin of reserve than we've had in the last half-dozen years."

Noting that the annual increase in de-



Heading up the Central Ontario district are: Standing, M. J. Broley, Scarborough; J. R. Dunn, North York; H. D. Hamilton, Aurora; Elmore Archdekin, Brampton, past president, and M. J. Damp, Toronto, secretary-treasurer. Seated, J. P. MacBeth, Etobicoke, first vice-president; E. D. Steer, Ajax, president, and J. L. Christie, East York, second vice-president.



Ed Steer last year made a gavel and presented it to District 4 president Elmore Archdekin. This year he accepts it back again as he takes over the reins of the Central Ontario group.



Receiving a 15-year long-service award from OMEA president Henry Baldwin is R. Clarke Wardlaw, Etobicoke Hydro chairman. J. C. Saddington, a Port Credit PUC member, also earned a long-service certificate but was absent for the presentation.



mand amounted to about six per cent, the smallest incremental increase in several years, Mr. Gathercole said there was a definite slowdown in the economy.

"Admittedly, some of the decline was brought about by strikes in the mining and steel industries, but in the main it reflects a definite slowdown in the economy brought about by the uncertainty of inflation."

He said Hydro expects to bring an additional 1.2 million kilowatts into service this year and during 1969 there was an increase in the amount of power sold to US utilities.

"The decade ahead looks to be very bright, challenging and stimulating for the entire Hydro movement in Ontario," Mr. Gathercole added.

One of the participants in another panel, this time on public relations, spoke a little too soon. Brian McFarlane, PR director at Maple Leaf Gardens, who was joined by Morley Kells, president of Leisuresports Promotions, Ltd., Don Watson, Ontario government caucus research director, and Jim Webb, an advertising agency account executive, told delegates it was his job to make the public aware that Maple Leaf Gardens is the "hockey mecca of Canada."

The New York Rangers were in town that night. The Leafs went down to a 7-1 defeat. □

## stress thinking not three Rs

Gone are the days when the three Rs were the focal point of the school curriculum, says Ontario's Minister of Education, William G. Davis.

The emphasis today is on teaching children to think, with less of the factual information thrown in, Mr. Davis told more than 100 municipal utility commissioners in his after-dinner speech.

"What we're doing in education," he said, "will determine the future economic growth of Ontario." And, he added, no one should attempt to underestimate the youth of today for its leadership qualities.

In his rundown on Ontario's streamlined educational system, Mr. Davis said: "Today, we find everyone's an expert in education. Every parent's an expert. Every grandparent's an expert. Trustees, taxpay-



*Incoming president Ed Steer welcomes Education Minister William Davis to the District 4 meeting. Looking on are Tony Green, of Oakville, and Don Hamilton, of Aurora.*

ers, teachers (by nature of their profession) and the students are all experts in education."

He continued: "So it should be, for education must be the responsibility of other than the trustees and professional educationists. Education must determine where we will go in the province, and it's the responsibility of every citizen of Ontario to help develop a viable, logical system of education. In the department, we think we have done this — and at cost figures which compare favorably with our neighboring jurisdictions.

"Ontario's bill for education is the third highest in the nation, and I'd stack our school system against any other, anywhere," Mr. Davis said.

He pointed out that the swing to regional or county boards of education would be completed at cost figures within one or two per cent of the price of operating a school board in each of the province's municipalities.

Mr. Davis attacked the growing disenchantment with the young people in our schools. "Everywhere we hear charges of rioting and what have you, but no one can answer the question 'where in On-

tario?' It's just not going on here. The reasons behind student riots in the US don't relate to students in Ontario," Davis said. He denied that young people were too permissive, although he suggested they were perhaps more flexible and self-disciplined than when the older generation attended classes.

However, Mr. Davis suggested, parents themselves must build a greater degree of self-discipline — "or there's no sense preaching it to the kids. Youth today is much more perceptive than ever before and much more knowledgeable than we were when we went to school, thank goodness," he added.

The problem of drug use and moral decay in the schools today was one that no one seemed able to comprehend, the education minister said, but it was impossible to relate it to the curriculum. And he urged parents to stop attempting to compare their child's progress with that of a neighboring child.

"Some parents react to the new type of report cards now being issued, but you can't damage the attitudes of a child by comparing his report with that of the kid next door."

"Besides, why should you react if Johnny doesn't," Mr. Davis said.



# along hydro lines

## Steps down

Ermer Wright has resigned as chairman of Mississauga Hydro for personal reasons." He was with the utility about 23 years.

Outgoing president of District 4, OMEA, Elmore Archdekin, paid glowing tribute to Mr. Wright at the group's annual meeting last month. Mr. Wright, too, was a former district president.

In addition to his Hydro activities, Mr. Wright was president of the Peel Music Festival in 1968 and has also been a volunteer worker with the Canadian Cancer Society and the Victorian Order of Nursing. Other welfare groups in the area also shared in his ability. □

## Tight money takes toll

Construction of Ontario Hydro's new head office, on the site where such show biz notables as Robert Goulet and Glenn Gould studied at the old Royal Conservatory of Music, has been deferred for at least a year.

Tight money and spiralling costs are to blame.

The 16-storey, \$33 million structure was scheduled for completion in early 1973. Announcing the change in plans, Chairman George Gathercole said he recognized the inconvenience to staff resulting from the use of rented quarters in five downtown Toronto locations. □

## Joining the chosen few

Lorne Gray, president of Atomic Energy of Canada Limited, has been chosen by the Governor General to be a Companion of the Order of Canada. With degrees in engineering and science plus several honorary doctorates, Dr. Gray has been AECL president since 1958. Order of Canada awards were established during the nation's centennial year.

Companions of the Order are selected on the basis of "merit, especially service to Canada or to humanity at large." The maximum number of Companions will never exceed 150. □

## Vinning ways

Ontario Hydro has been cited for two special awards from the American Public Power Association for "excellence in annual reporting and public relations achievement."

The special award for annual reports was won by Hydro's "short" annual report and the other recognized the excellence

of the commission's public electrical safety program, a combined effort of many people in many divisions.

Don Ramsay, director of sales, accepted the prizes at APPA's power sales — public relations workshop in San Antonio. □

## A thousand came to lunch

The biggest problem facing accident prevention people today is someone believing that accident prevention isn't a problem, says Electrical Utilities Safety Association field safety supervisor M. O. Shepherd.

But, he told more than 1,000 utility people attending the first of EUSA's 1970 accident prevention seminars in Toronto last month, three fatal accidents were recorded last year, 275 lost-time accidents — or one lost-time injury every working day — and perhaps 5,000 accidents EUSA hadn't even heard about. And, he added: "We've already recorded our first fatality of 1970."

Speaking on the design and maintenance of a safety program, Mr. Shepherd said: "In this day of jumbo jets, miniskirts and men on the moon we should be seriously considering remodelling our safety program to keep in step with changing times.

"However," he added, "the prevailing attitude among many utilities when it comes to the inauguration of a safety program is 'let George do it' — and George doesn't and the results are shocking."

He suggested that line crews practise pole-top rescue and resuscitation at least twice a year and pointed out that a lineman



For fast-rising young executives?

fatality in January left "a lot to be desired as far as resuscitation and rescue procedures were concerned."

H. L. Worsdall (in photo demonstrating some of the safety features of aerial bucket trucks to Gord Campbell, EUSA field services co-ordinator and Mr. Shepherd) warned the group that every manufacturer has a product which will do the utility's job — but how well was another question. He suggested that "serious thought be given to any piece of equipment before it's purchased, or all you'll get is a nice low purchase price.

"There's nothing wrong with a low purchase price as such, but the sweetness of a low price is soon forgotten while the bitterness of poor quality or misapplication of unsafe equipment you have to live with."

Other speakers included J. Craig, EUSA field safety supervisor, whose subject was fire protection and prevention, and E. T. Cole, EUSA training supervisor, who gave an address on injury prevention through training and development. The tour now swings to Kitchener on March 9 and 10; Chatham, March 11 and 12; Smiths Falls, March 24 and 25; and Thunder Bay on April 23. □



## New property boss



Arnold E. Huddleston



Milan M. Nastich

Milan M. Nastich was last month appointed director of Ontario Hydro's property division. He succeeds Arnold E. Huddleston, who asked to be relieved of the responsibility for health reasons. Mr. Huddleston will remain as a consultant in the division.

Mr. Nastich, who joined Hydro in 1949, became deputy property director last February. Born in Vancouver, he obtained a BA degree in 1947 and his BA Sc. a year later from the University of British Columbia.

Prior to joining the property division, Mr. Nastich was director of computing services. He has also worked as a planning engineer and methods analyst and manager of the systems department, budget and financial reporting department and comptroller.

Mr. Huddleston joined Ontario Hydro in January, 1928, and served in the construction division until 1940 when he transferred to property. He was named deputy director in 1956 and director at the end of 1967.

Born in Smiths Falls, Mr. Huddleston's early career includes farming, construction work and a short stint at Bell Canada. □

## municipal briefs

Commenting on a 10 per cent increase in local power rates, the Wingham Advance-Times says: "We can see no need for apology on the part of the PUC. Of all the things we pay for, hydro service is still one of the lowest in cost." The newspaper adds that the cost of electrical energy to domestic consumers in the community has never been increased and the price per kilowatt-hour today is only a fraction of what it was when the system was started more than 50 years ago.

Listowel PUC paid glowing tribute last month to retiring chairman E. M. Creighton for his 38 years' service to the commission. Mr. Creighton was defeated at the polls during the town's municipal election.

Windsor Utilities Commission chairman T. Stewart Anderson has called for tighter money belts on the part of utility employees. He said that if Ontario Hydro union workers obtain recent contract demands, it would be difficult to blame workers at the local level for wanting similar increases. Referring to people on fixed incomes, he said that "for every so-called social justice that is achieved by means of an increment in salary, there are thousands of social injustices created for others who are not in the position to compete with the ability of government to collect taxes or utilities to increase rates."

Stratford — the festival city — will see another type of show on May. This time it's the Association of Municipal Electrical Utilities equipment display. This year the scope will be broadened to cover streetlighting and two-way radio communications equipment. Curtain time is May 20-21.

Kingsville PUC commissioner Charles Broadwell died recently of his home. A lifelong resident of Kingsville, he was a member of the PUC for eight years.

Former London PUC commissioner Elmo Wallace Curtis bowed out of public life at the end of last year. His hobby was public service, but he says "it's getting to be a young man's world and I guess what convinced me to step out of public life for good was the realization I was thinking like the old man I am." He served from 1948 to 1969 on the PUC, except for a two-year rest after failing to be elected mayor in 1953. He was PUC chairman 11 times. Mr. Curtis is 67.

Peterborough PUC will carry out a nine-month test of a new method of providing and terminating electrical service. Under the new system the meter will be read when a customer notifies the PUC of plans to move, but service will be maintained unless the homeowner specifically asks to be disconnected. Upon arrival at his new residence, the customer will automatically pick up the meter reading from his previous home.

Brantford PUC has named foreman Joseph Tansley to succeed retiring Hydro superintendent William Emslie. Other appointments include Kent Edwards, operations engineer; Jack Gillespie, treasurer, and Leslie Rogers, personnel officer.

## It's that time again

From as far away as Pickle Crow and as close in as Scarborough, utility people will swarm around Toronto's Royal York Hotel on March 1, 2, 3 and 4. It's convention time again.

Highlight of the Ontario Municipal Electric Association-Association of Municipal Electrical Utilities annual get-together will be a joint session entitled "Vertical Protection," which is intended to demonstrate how proper streetlighting aids law enforcement agencies the world over in crime control.

Dunnville PUC manager John Dawson, who is responsible for this section, promises "a really big shew."

Again this year, the distaff side hasn't been overlooked. delegates' wives there's a tour of Ontario's Science Centre showplace of modern technology in which Hydro has a considerable stake.

## Lennox boilers to cost \$38 million

Ontario Hydro has awarded a \$38 million contract to Combustion Engineering-Superheater Limited for four oil-fired boilers for a new Lennox generating station.

Lennox station, at Bath, 22 miles west of Kingston, represents Hydro's first use of oil as a heat source to produce electricity. The \$278 million plant, due to produce first power in late 1995, will have an installed capacity of 2,295,000 kilowatts — sufficient to meet Ontario's total peak demand in 1947.

Each boiler will consume 780 barrels of oil an hour at full operation, and will be 150 tall, 70 feet wide and 32 feet deep. A \$55 million contract for the four turbine-generators was earlier awarded to Canadian General Electric.

## What price progress?

Ontario Hydro announced a \$50 million bond issue last month to partly finance its current multi-billion dollar expansion program. Consisting of 25-year, nine per cent bonds, the issue matures in February 1, 1995.



The bonds have the added advantage that they may be redeemed at the investor's option at par on February 1, 1975. At the same time as he announced the issue, Chairman George Gathercole told an Ontario Municipal Electric Association meeting that Hydro was repaying a three per cent bond issue with part of the money. □

## Speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Talk to any municipal Hydro official these days and he's likely to involve you in a conversation about higher costs. Judging from press clippings and discussion at municipal utility meetings, the effects of increased costs and their influence on electrical rates in Ontario is of prime concern.

A rate increase has perhaps more effect on the total group of customers in an electrical distribution system than any other administrative action. More than that, it has a personal and measurable influence on each customer.

There are, however, some positive observations to be made on the situation from a public relations viewpoint. A growing number of customers is learning to differentiate between wholesale rates (the cost of power to the municipal Hydro utility) and retail rates (the amount which the municipal utility charges its customers). This improved awareness helps to make the role of the municipal utility better understood and appreciated.

Within the last few months, many utilities have taken the initiative in explaining to their customers the various factors which influence local rates. Among others, three utilities who took direct and extensive action were Brampton Hydro, Deep River Hydro, and Kemptonville Hydro. Using the local newspaper, each explained the reasons why both wholesale and retail rates were subject to inflationary pressures.

Even in the midst of uncontrollable and unwelcome circumstances, a local utility can improve customer understanding and appreciation with a continuing communications system. As the younger people say: "Tell it like it is."

\* \* \*

An interesting and unexpected message came out of a panel discussion in Toronto recently. The setting was a district meeting of utility commissioners to which a panel of non-Hydro public relations and advertising people were invited.

During the question period, one of the audience asked the panel members what Hydro meant to them. The first panelist admitted he was confused by the term. The second confessed ignorance. The third found it hard to differentiate between municipal and provincial Hydros. The fourth said it meant clean and economical heat, but as a customer he didn't appreciate paying by computer.

From their candid answers, the audience was given a vivid and rehearsed example of the continuing need to tell the municipal Hydro story.

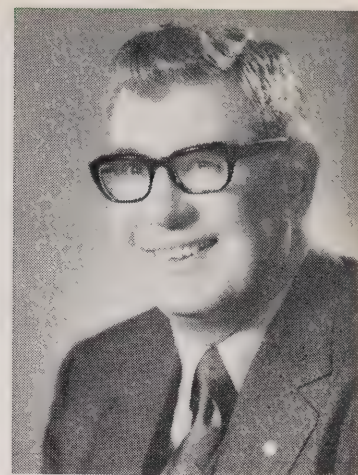
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The annual OMEA-AMEU convention in Toronto next month will feature the first presentations of a community relations achievement award. Also on display will be samples of annual reports and other direct mail pamphlets from utilities across the province. Commissioners and managers will have an opportunity to compare their communications programs with those of other local utilities serving similar groups of customers. □

## Top PR post



James A. Blay



James J. Durand

James J. Durand, operations engineer in Northwestern region, has been appointed director of Ontario Hydro's public relations division to succeed James A. Blay, who retires next month after 31 years' service.

Mr. Durand, 47, joined Ontario Hydro in April, 1949, after working with the commission during the summer months while studying for his B.Sc. degree at the University of Toronto.

For two years he travelled across the province as a member of the line maintenance staff, and was then appointed line maintenance supervisor in Hamilton. In 1954, he became Central Region line maintenance superintendent and 11 years later was appointed Essex area manager. He moved to Northwestern Region in 1967.

Mr. Blay joined Ontario Hydro in 1939 as manager of the sales promotion department and became the commission's first director of public relations in 1951.

He is extremely active in community and business affairs and was a president of the former Electric Service League. He is a former director of the Association of Canadian Advertisers; member of the public relations and publications committee of the Canadian Nuclear Association; the Kiwanis Club of Toronto; the Engineers Club; Canadian Public Relations Society; the public relations committee of the American Public Power Association; advertising and publicity committee of the Royal Agricultural Winter Fair; the executive of the Greater Toronto Region of the Boy Scouts of Canada, as well as other groups, committees and associations including the Canadian and Empire clubs and the Toronto Board of Trade.

For his work to mark Canada's centennial as a member of the Ontario Centennial Advisory Committee and the Canadian National Exhibition Centennial Committee, Mr. Blay was awarded the Canadian Centennial Medal. □

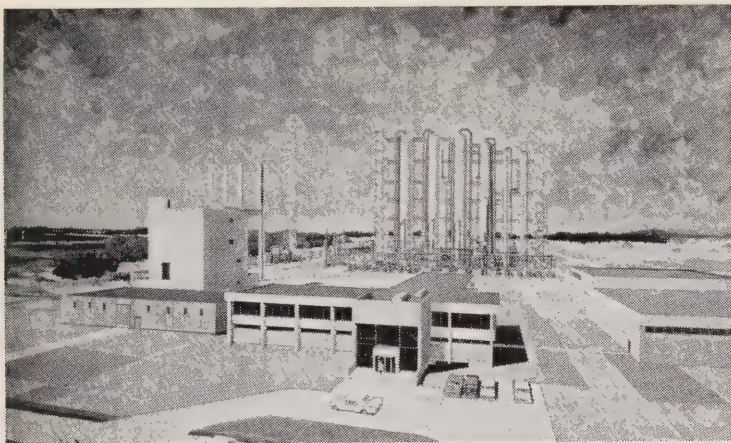
## Union seeks 14 per cent

Ontario Hydro Employees' Union has presented demands for a 14 per cent wage increase in a one-year contract with significant improvements in other areas. Among other benefits, the union is seeking retention of an escalator clause which under the new pact would provide for a one per cent increase in wages for every one per cent hike in the Consumer Price Index, improved vacation benefits, double time for overtime work and fully-paid OHSIP premiums.

Altogether, there are more than 200 individual items to be negotiated. □



## Shape of things to come



*How it will look*

Twin 250-foot first and second stage carbon steel towers are nearing completion as Atomic Energy of Canada Limited's \$115 million Bruce heavy water plant takes shape on the Lake Huron shoreline, midway between Port Elgin and Kincardine. Foundations for the two 400-ton-a-year units are completed and by summer the work force is expected to reach a high of about 1,000 men. Slated for operation in 1972 and 1973 respectively, the two units will provide heavy water for Ontario Hydro's Pickering generating station, near Toronto, and later for its Bruce generating station, which is being built near the heavy water plant.

The plant is being constructed by the Lummus Company Canada Limited. It will be operated by Ontario Hydro personnel. Completion of the heavy water plant, an auxiliary plant to supply steam for the manufacturing process, the Bruce station and the existing Douglas Point nuclear power station will create a unique nuclear power complex. □

## Electrical industry leads the pack



*The new boys*

The electrical industry was this month credited with being ahead of the remainder of the construction trades industry for its establishment of a uniform code of inspection to ensure the safety of building occupants.

C. D. Carruthers, chairman of the Committee on Uniform Building Standards for Ontario, said this while outlining at the annual meeting of the Ontario Electrical League the advantages of provincial building and fire codes based on national regulations.

The committee, he said, was set up by Municipal Affairs Minister Darcy McKeough in October, 1968, and last September submitted its interim report containing recommendations that

will require wholesale changes in Ontario regulations governing building in its many phases.

This year represented somewhat of a departure from previous OEL get-togethers in that no exhibit area surrounded the meeting rooms. OEL directors voted to hold a trade show every second year and in the "no-show years" the annual meeting only will be held.

Panel discussions centered on the topics "Electrical Year-Round Comfort — the Challenge for the '70s" and "The Urban Development Institute Takes a Look at the Electrical Industry."

Officers (photo) included Peter Thompson, of Northern Electric president; Gordon E. Marshall, Canadian Chromalox; Vanderheide, Vanderheide Construction, Sarnia; Dr. J. E. Wilsch, chairman of Barrie PUC; George A. Vaughan, Canadian General Electric, and G. K. F. Pepper, Ontario Hydro, vice-president. Absent when photo was taken was John A. Torrance, Etobicoke Hydro.

## Price hike predicted

A reinstatement of the recently suspended domestic copper price increase of nine cents a pound may force electrical manufacturers to boost product prices by two per cent during 1970, says Tom Lindsay, president of the Canadian Electrical Manufacturers Association.

Speaking at a National Electrical Week commemorative luncheon in Winnipeg, Mr. Lindsay estimated that a reinstatement of the suspended price increase would add about \$50 million to the cost of copper content for wire and cable manufacturers. He added this could have a "significant effect on prices of electrical products in 1970." Mr. Lindsay is president of Phillips Wire & Cable Ltd., a Brockville-based firm.

Major Canadian copper producers had previously agreed to suspend for two months a price increase of nine cents a pound. The increase, put into effect at the first of the year, raised the domestic copper price to 66 cents a pound. The producers had agreed to hold the price at 57 cents a pound during January and February, but have indicated they plan to return to the 66-cent level on March 1.

"There is another side to this price story that has resulted in jobs lost to Canadian workers. Despite the commendable productivity of Canadian electrical manufacturers, the industry is faced with severe price competition from foreign manufacturers who are operating in lower cost economies and who have added advantage of a larger and totally protected domestic market on which to achieve economies of scale not available to Canadian manufacturers," Mr. Lindsay said.

He pointed out that imports now account for about 30 per cent of the total domestic market for electrical products. "This," he added, "is just an average figure. In some cases, electrical imports are not large — in others they have virtually taken over the entire market."

While he wouldn't say that competition from abroad was the problem, Mr. Lindsay did suggest that living in a high-cost North American economy puts Canadian manufacturers at a competitive disadvantage with practically every other industrialized country with access to the same technology as Canadians.

## Where it's at

In Mother Goose, it goes something like . . . rich man . . . poor man . . . beggar man . . . but in the utility industry it's more like architect . . . engineer . . . consultant . . . designer. And they've all been invited to learn the hows, whys, whats and wheres about lighting and space conditioning in Toronto next month. Ontario Hydro and the Toronto section of the Illuminating Engineering Society are co-sponsoring a lighting seminar at the Canadian National Hotel on March 9. Light-up time is 2.30 p.m.



# Eating by numbers

by Les Dobson

Granted this is the age of computers, cybernetics and new math and any engineering organization has to live these days with a regular plethora of arithmetical gobbledygook, but have you paused between mouthfuls of late to consider the insidious trend in dining habits? These days we even have to eat by numbers.

You descend on Bill's Bun Joint, Alf's Apple Palace or some other gourmet's delight complete with chrome strips around the table and personalized jukebox slot and what do you find? Every item on the menu is identified by a number.

Number one: Haddock, french fries, coleslaw and a dill.

Number two: Hamburger patties, french fries, coleslaw and a dill.

Number three: Pork sausages, french fries, coleslaw and a dill.

Ever tried to order a meal without coleslaw and a dill? Thrown in for good measure is the soupe du jour, which as a leading proponent of bilingualism I recognize as a rough translation of "the leftovers from last week's chicken". All good, solid lunchtime fare, of course. But then the fun starts.

Every waitress has her own number and every table has a number, too. All of which causes endless headaches when a regular customer tries to buck the system.

For instance, one lunchtime recently I pounced into my favorite restaurant and, feeling a little capricious, gave the usual table a miss. To make matters worse, instead of Monday's chile con carne special (or shall I use the royal "we"?) plumped for chicken à la king.

Number three — that's the little waitress with the cute legs and the shapely derrière — wiggled hurriedly over to number five, the old one with the permanent sniff.

"Did ya see that?" she screeched (number five is also a bit on the deaf side). Number seventeen's sitting at number x and he's ordered a number eight."

"Gees," said the older woman. "I'll have to sit number six (sniff) with number nine (sniff) and you know they never get on (sniff)."

In all fairness though, it should be pointed out that the number system of eating is of inestimable value to people

who are new to the country and who haven't had time to polish up their English. Numbers save time, misunderstandings, frayed tempers and countless fist fights. And nowhere are the benefits of this digital diet more apparent than in that symbol of oriental splendor... the Chinese restaurant.

Unlike most customers, I nearly always head for the table nearest the kitchen. This way I can order a number forty-two and listen enthralled as the waiter calls through the serving hatch.

"Chumboyaboya chensingkowitz yingling meyapan," he usually says, or words to that effect. Really, there's no wonder they resort to numbers. If the Chinese language is that difficult, just think what he'd make of "noodles fried with bamboo shoots and chicken, shrimp and barbecued spareribs. Oh, and don't forget the egg rolls, please."

So perhaps the number system is here to stay, although even within the narrow confines of the mathematical menu I feel there's ample room for improvement. How about a delectable Square Root of Two, for instance, to get the tastebuds working? Or a mouth-watering, palate-titillating Three-Cubed? And surely a platter entitled Base Seven would be sufficient to whet the appetite of anyone but a charlatan. A little experimentation would allow the true cordon bleu to assign algebraic values to ingredients, giving rise to compound dishes.

You can see the menu now. "Try our delicious A-squared plus 2AB plus B-squared, only \$1.75. Roll and butter extra."

Slide rules and trigonometry are obviously capable of raising haute cuisine from a rather vague and inexact art to the level of a precise science. A pinch of calculus here could have more lasting effect than a pantryful of herbs and spices. A dash of non-Euclidean geometry there would surely revolutionize the nation's eating habits.

Boolean algebra would undoubtedly find a major role while the Einsteinian formula of  $E=MC^2$  could successfully be applied to a bowl of beans to produce an explosion as effective as any nuclear blast but without the resulting danger of radioactive fallout.

There's certainly merit in these ideas, although the traditionalist will no doubt continue to shun such exotic numerical fantasies. I discovered this on a recent business trip to Montreal where, bolstered by my usual liberal expense account, I felt duty-bound to dine in ultra-traditional fashion.

It was one of those chintzy joints with table covers and black-coated waiters

hovering around like something out of last night's late show. The menu was handwritten, a mile long and I couldn't get beyond the "poulet à la crème" something or other.

Well, situations like that can be darned embarrassing and I was just beginning to turn the color of those deep red tablecloths when I had a flash of inspiration. I looked the head waiter right in the eye, gave him a knowing wink and muttered rather offhandedly, "Numero cinq, s'il vous plait."

The "s'il vous plait" bit may sound like a masterstroke, but mother had been very firm before I left that this wouldn't be Toronto and I had to display a few manners. Anyway, it was an immediate hit. Now it was the waiter's turn to give me a knowing wink. In fact, it was downright conspiratorial.

"Numero cinq? Mais certainement, monsieur," he said with just the hint of a grin and motioned for me to follow him. We wound through the tables, right out of the room and started up some stairs.

"My God, he thinks I want the john," I thought. But he was already halfway up the stairs and I had to see it through. We walked down a long hall with doors on either side and he stopped to tap discreetly on one.

Oddly enough, it was room number five. And the door was opened by the most gorgeous blonde dressed in the flimsiest of negligees.

Prettiest dish I ever did see!





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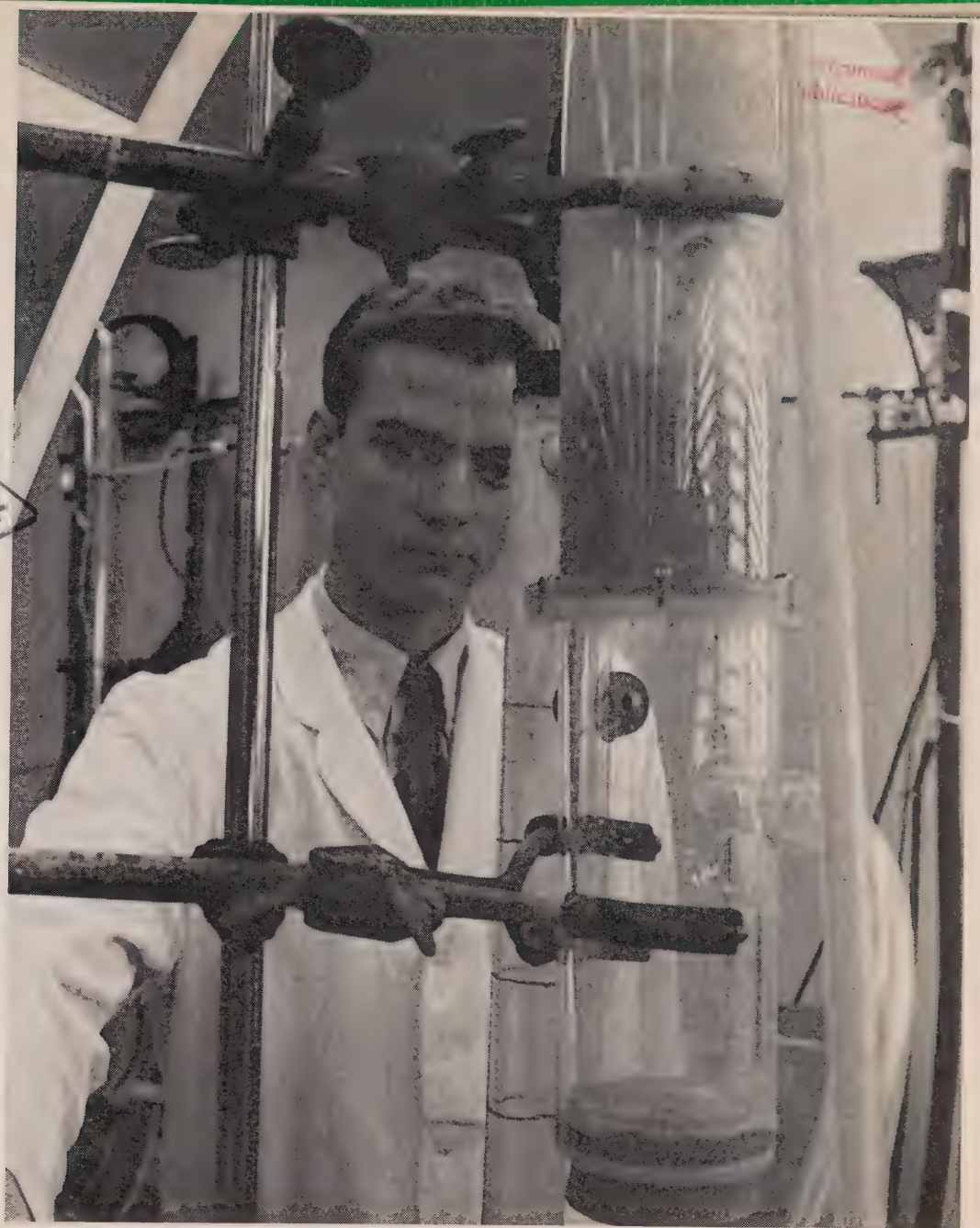
TORONTO 5                      ONT



## power hunger

Ontarians have a king-sized appetite for electric power. To help relieve the hunger pains, Ontario Hydro has authorized an unprecedented generation construction program costing about \$2.5 billion. Wells generating station, one of the province's few remaining hydro-electric schemes capable of economic development, will become the fourth plant to tap the Mississagi River's power potential.





# **pollution special**

## **ontario hydro news**

march/1970







## news

### march/70

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#### the cover

In Ontario Hydro's research laboratories, a technician watches as sulphur dioxide gas is passed through a limestone slurry. The aim is to find a commercially feasible method of sulphur removal that can be applied at large coal-burning power stations. More about this aspect of pollution research appears on page 6.

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Bill Flett, Design

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#### Viewpoint

## We care, too

What is biologist Dr. Ray Effer doing at Ontario Hydro? As a member of the anti-pollution team at the Commission's modern research laboratories, he is not so far removed from the nuts and bolts of power production as may at first appear.

The production and distribution of electricity on the enormous Hydro scale requires a great deal of know-how beyond the confines of power engineering and technology. No undertaking of this nature and proportion can be carried out without affecting the environment and involving the community.

That's why Hydro maintains a team of scientists in disciplines ranging from medicine to meteorology studying environmental problems and keeping in close touch with related developments around the world. Less apparent, perhaps, than the efforts of the men who build the stations and operate the power systems, the work of this team is just as vital to the production of kilowatt-hours.

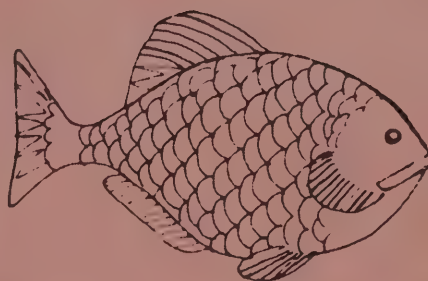
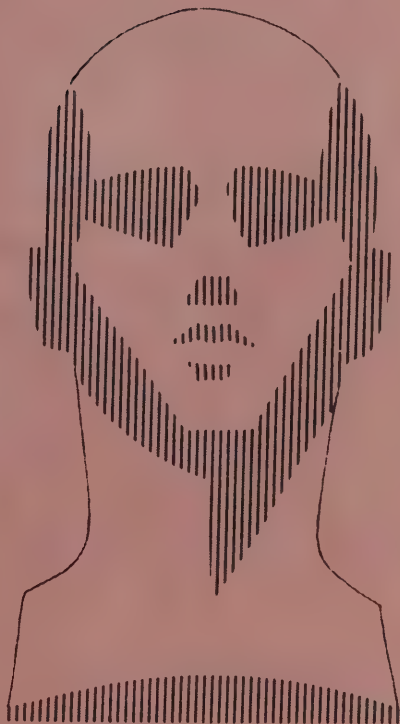
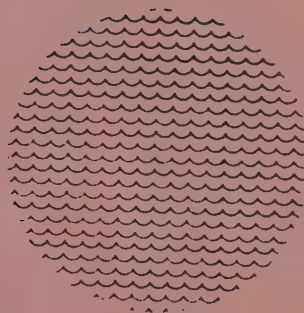
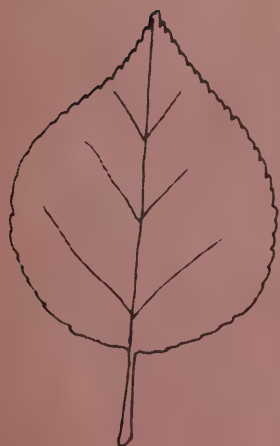
As an integral part of the total geographical and sociological package, Hydro can only fulfill its responsibilities in the realm of electrical supply with the consent and support of the people it serves. The public must be convinced that its electrical affairs are in the hands of responsible professionals. In the field of air and water quality control, as it relates to power production, the Hydro group is unsurpassed in its ability and knowledge.

Expertise is not enough if the objectives are too limited. Hydro is also demonstrating that it intends to meet its obligations in full by treating environmental considerations as a major item in the cost of doing business. In addition to its own research, Hydro is participating with other utilities and agencies in finding ways to minimize any undesirable effects associated with its operations. As in the past, it will continue to incorporate the very latest and most efficient anti-pollution equipment as it becomes available.

Economic considerations must continue in the forefront of its planning and development, but cost is only one of the factors Hydro must weigh in striking a balance between the need for power and the equally pressing requirements of an abused environment.

Pollution control is both complex and costly. No simple answer exists. Only a rational and objective approach utilizing all the wisdom and technology available can be successful. Hydro believes its anti-pollution efforts are second to none in the utility field. Some of the details associated with its program are set out in this issue.





# Warning signs in the ecosystem

es Dobson

ve move into the seventies, there's doubt that air, land and water pollution will be one of the big issues of the decade, just as education was emphasized in the sixties and construction in the fifties.

ments range from complacent acceptance of pollution as part of the price of modern affluence to dire predictions of the extinction of all life on earth in a very short period. Perhaps the truth lies somewhere in between, yet the fouling of our environment certainly impinges upon a diversity of factors: political, economic, physiological, and even evolutionary overtones.

dy there are warning signs in the ecosystem — that delicate pattern of relationships between plants, animals and environment. Too little is still known about this intricate balance hence dis-

agreement on all sides about the possible effects of pollutants. Subtle changes are occurring and just what their ultimate effect will be no one really knows.

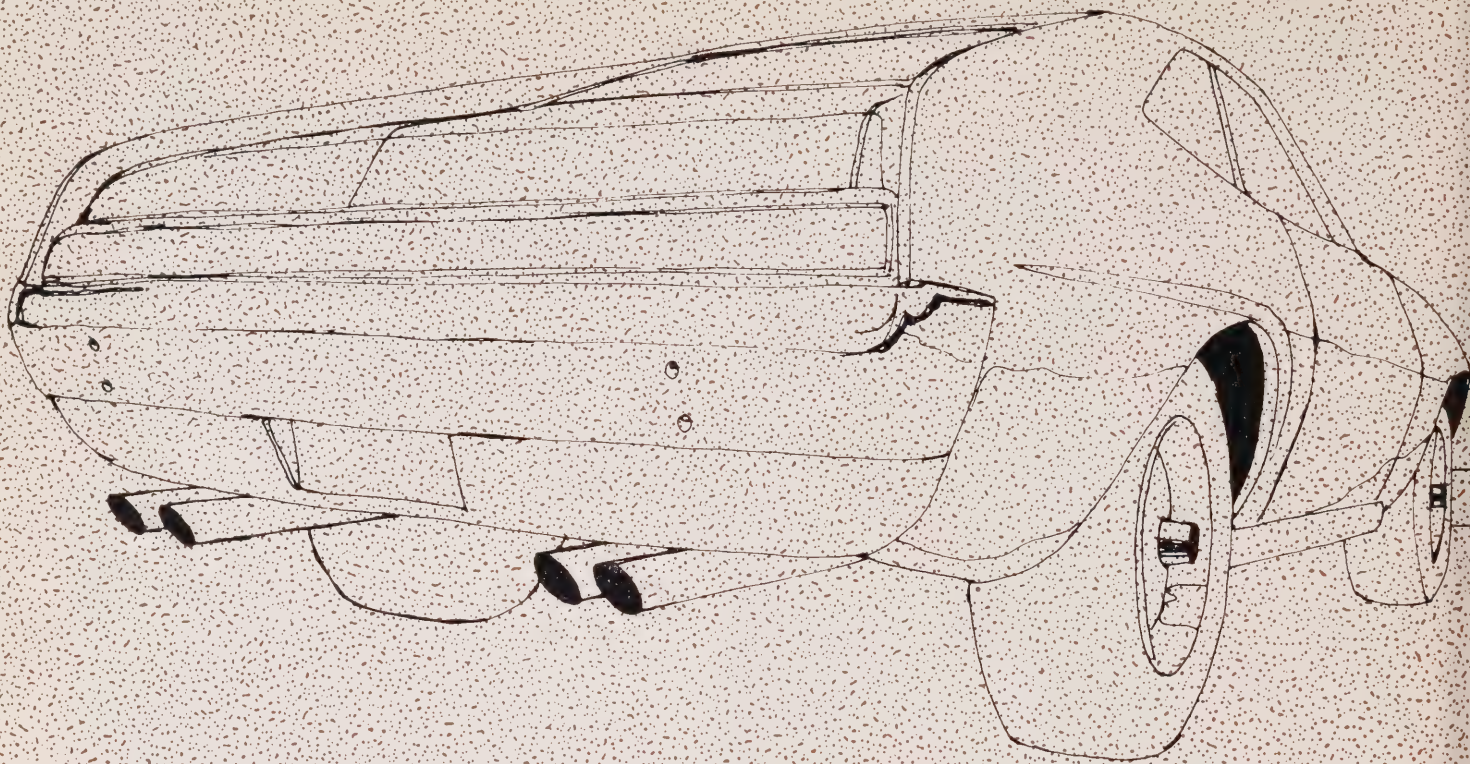
Not that the environment has remained constant over the ages. Take, for example, the earth's atmosphere. While today it consists chiefly of nitrogen, oxygen and small amounts of carbon dioxide, there's considerable evidence that two billion years ago it was largely composed of ammonia, methane and water vapor. Indeed laboratory experiments have shown that the passage of a spark through such a mixture can produce the amino acids and other organic materials favorable to the development of life. There's evidence, too, that the carbon dioxide content of the atmosphere has varied considerably in the past, rising during periods of high volcanic activity

and falling when the volcanoes were quiescent.

The business of change through natural causes continues today. Volcanoes still belch their debris and fumes into the upper atmosphere while decaying vegetation will hasten the eutrophic processes of even the purest lake. Nevertheless, the problem of pollution is essentially a modern phenomenon that had its beginnings in the discovery of coal and the large-scale practical application of scientific discovery. Pollution is the unwanted child of the industrial revolution.

As the birthplace of this revolution, England has a long-standing and intimate association with the by-products of coal, which was first used on a serious scale in the 13th century when supplies of firewood began to run out. As early as





1255, Eleanor of Aquitaine moved from London to Nottingham "because of the insufferable smoke." Soon after, Parliament prohibited the burning of coal in London and in 1306 an artificer was executed for this offence.

Three hundred years later, the brewers of Westminster offered to use wood instead of coal because of Queen Elizabeth's allergy to coal smoke. Toward the end of Elizabeth's reign, the use of coal was again banned in London although only while Parliament was sitting. Again the ban was ineffective.

John Evelyn, one of the founder members of the Royal Society, offered his solution in a pamphlet published in 1661 by the express command of Charles II. Entitled "Fumifugium; or the Inconvenience of the Aer and Smoke of London Dissipated; together with Some Remedies Humbly Proposed," the paper recognized the sources, effects and broad aspects of air pollution and its control and went so far as to suggest moving all smoke-producing plants out of the city.

The smoke nuisance in London and other cities was so acute by the beginning of the 19th century that Parliament appointed a select committee to study and

report on smoke abatement. It appears to have resulted in little or no action.

With only sporadic outbursts of public dissent, matters were allowed to slide until that fateful December of 1952 when extremely stable meteorological conditions in the Greater London area contributed to a build-up of gaseous and particulate effluents over a period of several days. Winds eventually sprang up to clear the smog – a hybrid word coined from a combination of smoke and fog – but by that time noxious fumes had claimed 4,000 lives.

Undoubtedly this event, coupled with a similar but less disastrous smog that caused 17 deaths at Donora, Pennsylvania, in 1948, did much to focus public attention on environmental pollution. Yet a great deal of the pressure on pollution issues stems today from Los Angeles, which because of its peculiar geographical position and huge automobile population suffers frequent smogs.

Fortunately, the occurrence of killer smogs has become less and less frequent with the establishment throughout Britain of smokeless zones in which the burning of anything but smokeless fuel is expressly forbidden.

From the start, the major source of air

pollution has been the combustion of fuels, and since the turn of the century petroleum has joined and then superseded coal as the chief contributor.

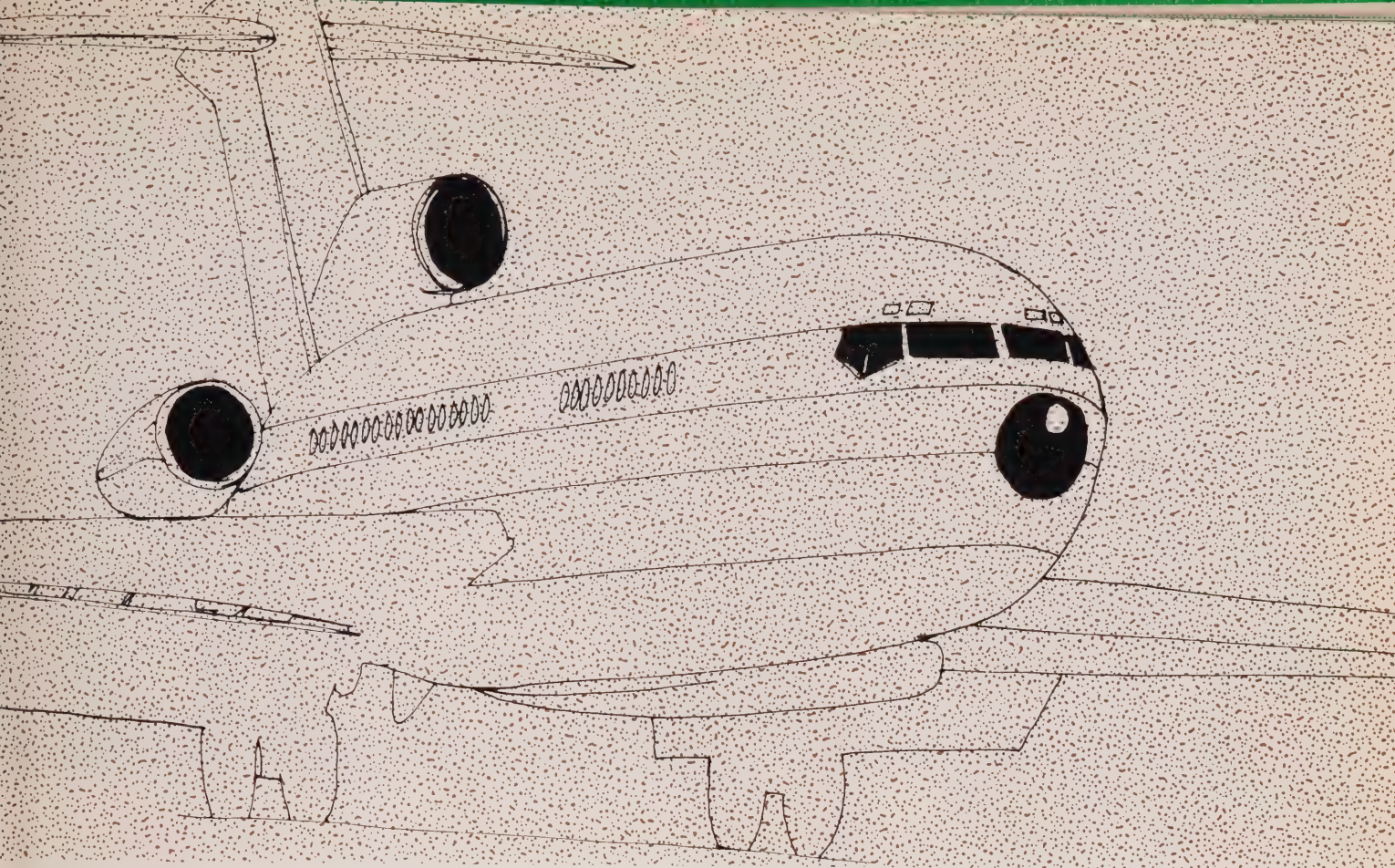
Automobiles, in fact, accounted for 60 per cent of the 142 million tons of pollutants poured into the atmosphere of the United States in 1965. Industry came second with 17 per cent, electric power plants a close third followed by space heating and refuse disposal.

The five most common primary air pollutants are carbon monoxide, sulphur oxides, hydrocarbons, nitrogen oxides and particulate matter.

Carbon monoxide is almost exclusively a man-made pollutant, the automobile contributing an estimated 80 per cent of all emissions. While chemically inert, large concentrations are dangerous, even fatal, to mammals because of the affinity of this gas for hemoglobin – the oxygen-carrying substance contained in red blood cells. Hemoglobin combines even more readily with carbon monoxide than it does with oxygen, and thus becomes incapable of transporting oxygen to the brain and other vital organs. Death quickly results.

Chief among the several forms of sulphur that exist in the air are sulphur dioxide





hydrogen sulphide. Both are capable of combining with water to form sulphuric acid, the effects of which on materials and lungs need only be left to the imagination. Combustion accounts for about 90 per cent of the global total of sulphur dioxide, the smelting of nonferrous metals and petroleum refining for most of the rest.

The only apparent natural source of sulphur dioxide is volcanic gases. On the other hand, large amounts of hydrogen sulphide are produced by decaying organic matter both on land and in the oceans. It is also emitted by some industrial operations. Because of their highly corrosive properties, both gases may be found in significant concentrations.

The natural production of nitrogen oxides and hydrocarbons far exceeds the amounts that man produces through combustion. Biological processes in the soil are thought to be a major contributor of nitrogen dioxide, and so is lightning. Forests and vegetation emit sizeable amounts of hydrocarbons; the bacterial decomposition of organic matter produces large quantities of methane.

Again, it is the internal combustion engine which raises the concentration of these gases to unusual levels in urban

areas, where their main polluting effect is the creation of photochemical smog. Nitrogen dioxide, a strong absorber of ultraviolet light, is the trigger for this complex series of reactions. Perhaps best known for its smogs on the North American continent is Los Angeles, which is sheltered by mountains, experiences long hours of sunshine and has a huge automobile population.

Particles of nitrogen dioxide may be either liquid or solid in nature and it is impossible to generalize on their chemical behavior because of their diversity and extremely small size. They mostly range from 0.1 to 10 microns (a micron is one-millionth of a metre). One of their main effects is climatic — they lower the mean temperature of the earth by scattering incoming radiation from the sun.

One other gas is worth mentioning, although it is not commonly regarded as a source of air pollution, and that is carbon dioxide. Vast amounts are nevertheless being released by combustion. The carbon in every barrel of oil and every lump of coal was once present in the atmosphere as carbon dioxide and, within a few short centuries, man appears to be returning to the air a significant part of the carbon that was slowly extracted by

photosynthesis and buried in the sediments over half a billion years.

A US Presidential Science Advisory Committee has estimated that by the year 2000, fossil fuel combustion will have increased the amount of atmospheric carbon dioxide by 25 per cent compared with readings taken in the 19th century.

Because carbon dioxide is a strong absorber and back-radiator of infra-red wavelengths, the committee hypothesizes that this increase could have a "greenhouse" effect, markedly raising the temperature of the lower air and perhaps leading to a melting of the polar ice caps. However, elevated temperatures and carbon dioxide levels should eventually result in elevated photosynthesis and a consequent increase in carbon fixation. Thus the cycle should be self-reversing.

Nuclear science has added yet another perspective to the pollution picture — that of radioactive fallout. Most of the 200 or so radioactive isotopes released by nuclear explosions are not important as internal radiation hazards to man because of the small amounts involved, extremely short half-life (the time during which the radioactivity of a substance falls to half



its original value) or because they are not incorporated into the food chain.

One of the notable exceptions is strontium-90, which remains in the soil for a lengthy period, is ingested by cattle and finds its way into human bone tissue chiefly through the consumption of contaminated milk.

Nuclear power plants, on the other hand, present few problems because of the stringent precautions taken against an accidental release of radioactive material.

Speaking at a conference on "Nuclear Power and the Public" at Minneapolis last year, James T. Ramey, of the US Atomic Energy Commission, commented: "We have now had about 10 years' experience in the operation of licensed nuclear power reactors . . . the quantities of radioactivity released are so small that it has been difficult to measure any increase above natural background levels in rivers and streams."

Part of the problem in determining what pollutants are harmful is that some of their effects become noticeable only over the long-term. An apparently innocuous agent today may become the spectre of tomorrow, giving a tendency for pollutants to run in fads. Another factor is that a distinction must be drawn between short-term exposure to excessive pollution and prolonged exposure to ordinary urban air pollution.

A great deal more research is needed into the relationship, if any, between ordinary urban air pollution and such conditions as lung cancer, emphysema or heart disease.

Wildlife, on the other hand, is far more vulnerable to pollution than humans. An oil slick has the potential of killing hundreds of thousands of gulls. Another factor is that the effects of pollution on wildlife are less likely to be detected until it is too late. While farmers will quickly notice the impairment of livestock or crops, an entire wild population might disappear before the effects of a pollutant are recognized.

No more dramatic proof that pollution affects the very process of evolution is required than that furnished by the spread of industrial melanism throughout the British Isles. About 10 per cent of the larger moths found there have been undergoing a marked darkening in coloration in areas of heavy industrial activity.



*Whether it's polluted air or polluted water, the effects should be viewed in terms of the total environment.*

In 1848, a coal-black mutant form of the peppered moth was found near Manchester and since that time has steadily become more prevalent until more than 90 per cent of the species is black. What happened was that the mutant is practically invisible to predators while resting on the soot-blackened trees of Northern England. The original, lighter-colored version of the species was easy prey and has been all but eliminated by natural selection.

On the economic scene, air pollution corrodes metal, weakens fabric and soils clothing. Buildings crumble, rubber cracks and paints fade under its onslaught. In spite of a number of studies, no comprehensive picture of the costs of air pollution has emerged although estimates have been made from partial assessments.

One study conducted in Pittsburgh in 1913 estimated \$20 per capita each year in tangible losses. This did not include aesthetics or damage to health. In 1954, the Beaver Report, a government-inspired white paper, put the annual losses from air pollution in Britain at £250 million.

Much of the deterioration of materials by air pollution goes unnoticed because it cannot be distinguished from natural deterioration, for example by oxidation.

However, one source for the Beaver Report estimated that one-third of the cost of replacing railroad tracks in England was attributable to corrosion from air pollution. The report also stated that after the 1952 smog, one chain store had to reduce the prices of damaged goods by £90,000.

What, then, can be done to reduce the steady and relentless build-up of pollutants in the environment? Even if there were conclusive evidence that pollution was endangering the existence of life on earth, it is unlikely that governments could ever persuade the populace to forego the benefits of modern industrial society (electric power, for example). Indeed, it would spell the end of civilization as we know it.

It was the large-scale application of technology that introduced the problem in the first place, and it is to science that we will have to turn for the answers.

As we're unlikely to call a halt to industrial processes or pull the automobile off the road, other solutions must be sought. One of the earliest recognized method of reducing the ground-level concentration of pollutants was to build tall chimney stacks, and this is still the only effective form of dispersal.





Ontario Water Resources Commission

Modern electric power stations and industrial plants have stacks that are multi-flued to add velocity to waste gases that range up to 1,000 feet in height, enabling them to punch through the underlying blanket of air of a temperature inversion. Particulate matter is removed by highly-efficient electrostatic precipitators, which are rated up to 99.5 per cent effective.

The tall stack can only be regarded as an interim pollution measure, particularly in the case of coal or oil-fired electric power plants.

To some extent, the gradual transition to nuclear power will help the over-all picture. By the end of the decade, Ontario will derive roughly one-quarter of its electricity from nuclear plants.

However, fossil fuel plants are far more dependent on meeting the sudden rise and fall in demand for electricity than are base-load nuclear plants and there is likely to be a long time for them for a long time to come.

Among the most important power station emissions are the sulphur oxides and nitrous oxides. Engineers are studying a number of processes aimed at removing these on a commercial scale. They include reaction with limestone or dolomite and catalytic conversion to sulphuric acid.

Considering the importance of electricity to the economy, costs are an important factor. It is believed that some of these processes may add to the cost of electricity by only a few per cent, although firm figures will not be available until operating experience has been gained. Indications are that the use of low-sulphur coals and oils are only a partial solution which will have to be used in conjunction with extraction methods.

As for the automobile, pressures for the abatement of air pollution have revived interest in steam-driven and electrically-powered vehicles, both of which were unable to compete with the gasoline engine in the early days of the automotive industry.

Several cars using alternative power sources have appeared over the years only to sink back into obscurity. Suggestions have been made for electric runabouts for city driving, or even hybrid vehicles with a gasoline engine for highway use and electric storage batteries or fuel cells for powering the car in urban areas. According to a US Department of Commerce panel on electrically-powered vehicles, though, the electric car seems unlikely to emerge before 1985.

In the meantime, a variety of filtration and catalytic systems offer hope for the

reduction of hydrocarbon, nitrogen oxides and carbon monoxide emissions from car exhausts. The Department of Commerce panel estimates that such systems might add between \$50 and \$300 to the cost of cars produced in the 1975-80 period.

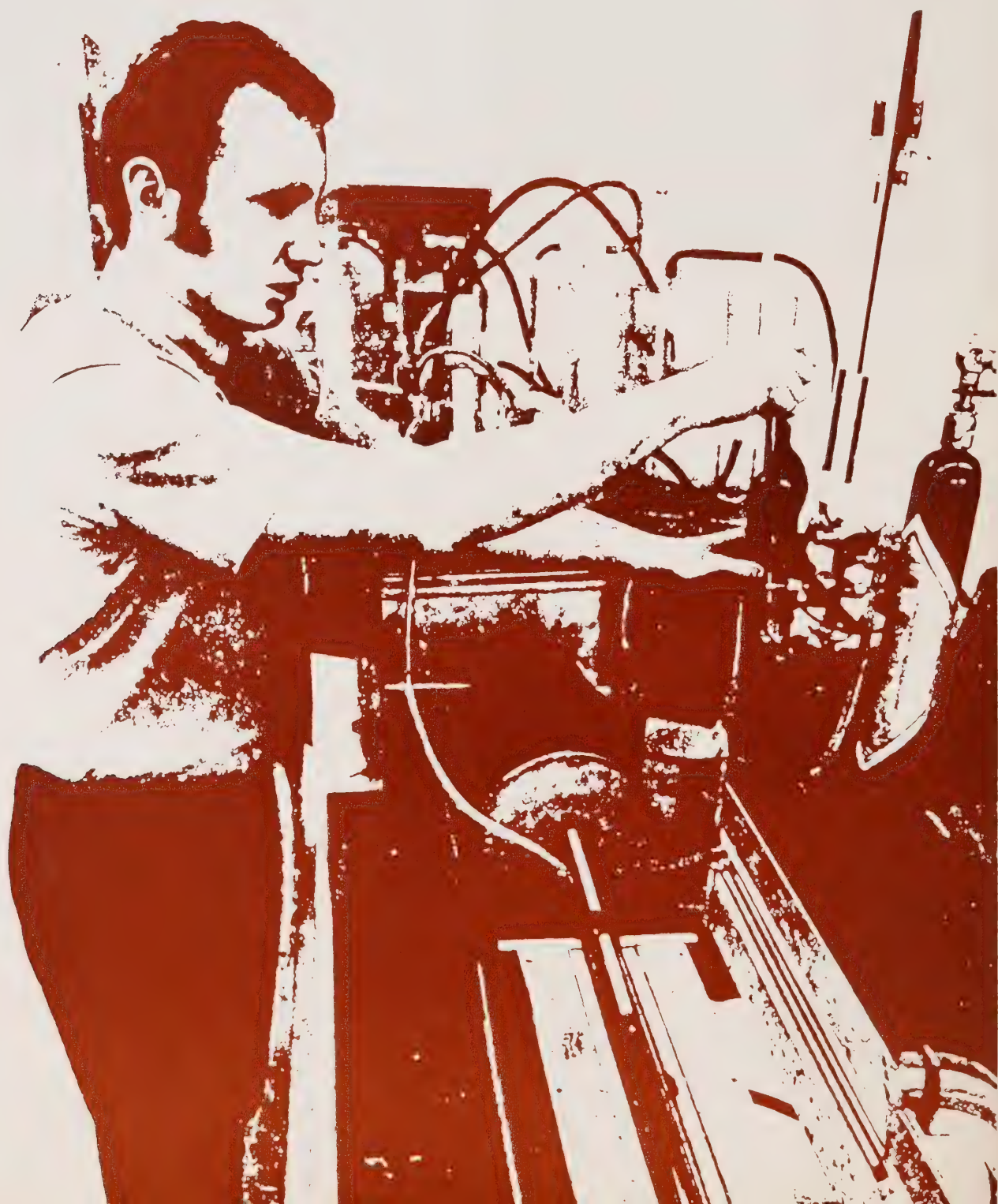
It seems reasonably clear that, given the time and necessary financing, science can come up with most of the solutions to industrial and domestic pollution. Yet it must receive some impetus and about the only effective method appears to be through public pressure and legislation. Municipal, provincial and federal authorities are all moving steadily in this direction.

Examples of the concern with which the problem is viewed may be seen in the recent banning of DDT and the threats by government to industry to "clean up or else." In Ontario, the penalties for companies contravening the Air Pollution Control Act were recently raised to a \$5,000 maximum fine for a first offence and \$10,000 for each subsequent offence. Individuals contravening the act are liable to a maximum fine of \$2,000. Indeed, there is a growing awareness that the individual as well as big business has a responsibility toward the pollution problem. The signs, at least, are encouraging. □



# BANISHING BRIMSTONE

by Bob Morrow





removal of sulphur dioxide is fraught with difficulties. How, for example, does one dispose of large quantities of epsom salts?

*A number of sulphur removal processes involving reactions with solids, liquids and gases are undergoing exhaustive tests at Ontario Hydro's research laboratory.*

When sulphur-laden flue gas passes through a limestone bed at Ontario Hydro's research laboratory, the initial reading on sulphur dioxide recorder is zero. All sulphur has been cleansed from the gas.

If this technique worked as efficiently in a coal-fired generating station, many of Ontario Hydro's worries would be over. The process would be relatively inexpensive and a lot of people would breathe easier.

But the research team isn't shouting "Eureka." As the gas continues to pass through a simulated station boiler, the sulphur dioxide reading begins to rise. The limestone has lost its capacity to absorb any more sulphur.

The solution would be to keep on using fresh limestone. This could be achieved by blowing large quantities of powdered limestone into the boiler, where it would absorb the sulphur and be recaptured in the station's electrostatic precipitators.

Laboratory tests indicate the process shows promise and plans are well under way to conduct full-scale tests at Toronto's L. Hearn generating station.

Douglas Harrison, a tall, soft-spoken chemical engineer who manages Hydro's pollution abatement research team, says the key is whether the limestone will absorb a significant amount of sulphur from a large volume of gas in the incredibly short time of one second.

Another question is whether the precipitators will handle the limestone in addition to fly ash and, if not, how much extra dust collection equipment will be needed?

Limestone injection is only one of several sulphur removal processes being investigated by the team in a search that has all the elements of a mystery story. Clues must be painstakingly tracked down and circumstantial evidence sifted. Dead-ends must be avoided.

For example, one type of limestone rich in magnesium is unsuitable because it reacts with sulphur to produce magnesium sulphate. Better known as the white epsom salts, this could create a serious disposal problem.

"We have intensively studied Ontario limestones to avoid the trap of solving one problem and creating another," says Harrison.





*Technician operates electrical apparatus designed to concentrate sulphur oxides into an enriched gas to permit easier removal. Right: one of the chemical absorption processes under study uses potassium sulphite to remove sulphur.*



Scientific literature describes more than 100 methods of removing sulphur dioxide from flue and smelter gases. Most of them are unsuitable for use in large generating stations.

A process may work on a smelter gas containing about 30 per cent sulphur. It may work well in the laboratory or in a pilot plant. But a modern 2,000,000-kilowatt coal-fired station may require the treatment of more than 5,000,000 cubic feet of gas a minute, containing less than 0.2 per cent sulphur by volume.

Some processes are technologically unfeasible for large power plants. One widely-publicized process has been installed to treat six per cent of a US generating station's flue gas, but has yet to be tested and proved in a full-scale plant. Since the capital, operating and maintenance costs of sulphur-removal systems are likely to be high, the moment of truth will come when several promising processes are compared. Then, projected costs vary by millions of dollars.

In fact, the field narrows down to a handful of processes which may, or may not, be applicable to large power stations. Hydro is investigating these in a number of ways including the amassing of technical literature, on-the-spot evaluation and financial support of research by private industry.

For instance, the commission has joined 15 US utilities to back a \$6¼ million study by Babcock-Wilcox and Esso Research to develop an economical sulphur-removal system. Hydro's share is \$140,000.

In addition, laboratory experiments are being pushed by mission-oriented chemical engineers and technicians on the pollution abatement research team, who freely draw on the experience and knowledge of other Hydro experts in high-voltage research, chemistry, geology and biology.

The pollution research laboratory is a world of graphs, graduated beakers, electric furnaces and sensitive measuring instruments. A bellows-type stack is used to vent experimental flue gases through the roof.

You're likely to find a blackboard covered with chemical formulae, such as  $2\text{CaO} + 2\text{SO}_2 + \text{O}_2 = 2\text{CaSO}_4$  which means that calcium oxide, sulphur dioxide and oxygen combine to produce calcium sulphate. Some day that formula might be the key to removing a significant pollution problem.

Three basic methods of removing sulphur from gases, with many possible variations,



being studied in the lab: removal by reactions with a solid like limestone, with other gases and with liquids.

The difficulty with wet processes is that the remaining gases become saturated with moisture and loop downward from the stack to ground level. Scrubbing processes might therefore require costly heating of the gases to get the desired buoyancy.

Other possibilities are being pursued. Engineers in the electrical research department are working on an ingenious process that involves placing an electric charge on sulphur dioxide molecules. The idea is to employ electrical attraction to concentrate sulphur oxides into an enhanced gas on the walls of a tube so that the sulphur can be more easily removed.

Why not remove sulphur from the coal itself? Dr. Abdus Saleem, another Hydro scientist, says the main problem is that coal contains three types of sulphur. Pyritic sulphur can be readily removed, but organic sulphur is chemically bound

to the coal particle and difficult to separate. The third type, consisting mainly of calcium and iron sulphates, occurs in negligible amounts.

Removal of pyritic sulphur from the two per cent sulphur coal that Hydro buys would still leave an unacceptable amount — about 1.4 per cent — Dr. Saleem said. The process would require a large investment in pulverizing equipment with undependable benefits and would be only a partial solution.

In addition, coal composition varies from mine to mine. Prospects would be brighter if Hydro could obtain coal which consistently contained a higher percentage of pyritic sulphur, but that possibility is slim.

Another proposal involves the manufacture of low-sulphur, solvent-refined coal which could be burned as a liquid or solid. The process has been proved technically feasible in the US, but projected costs are prohibitive for most utilities.

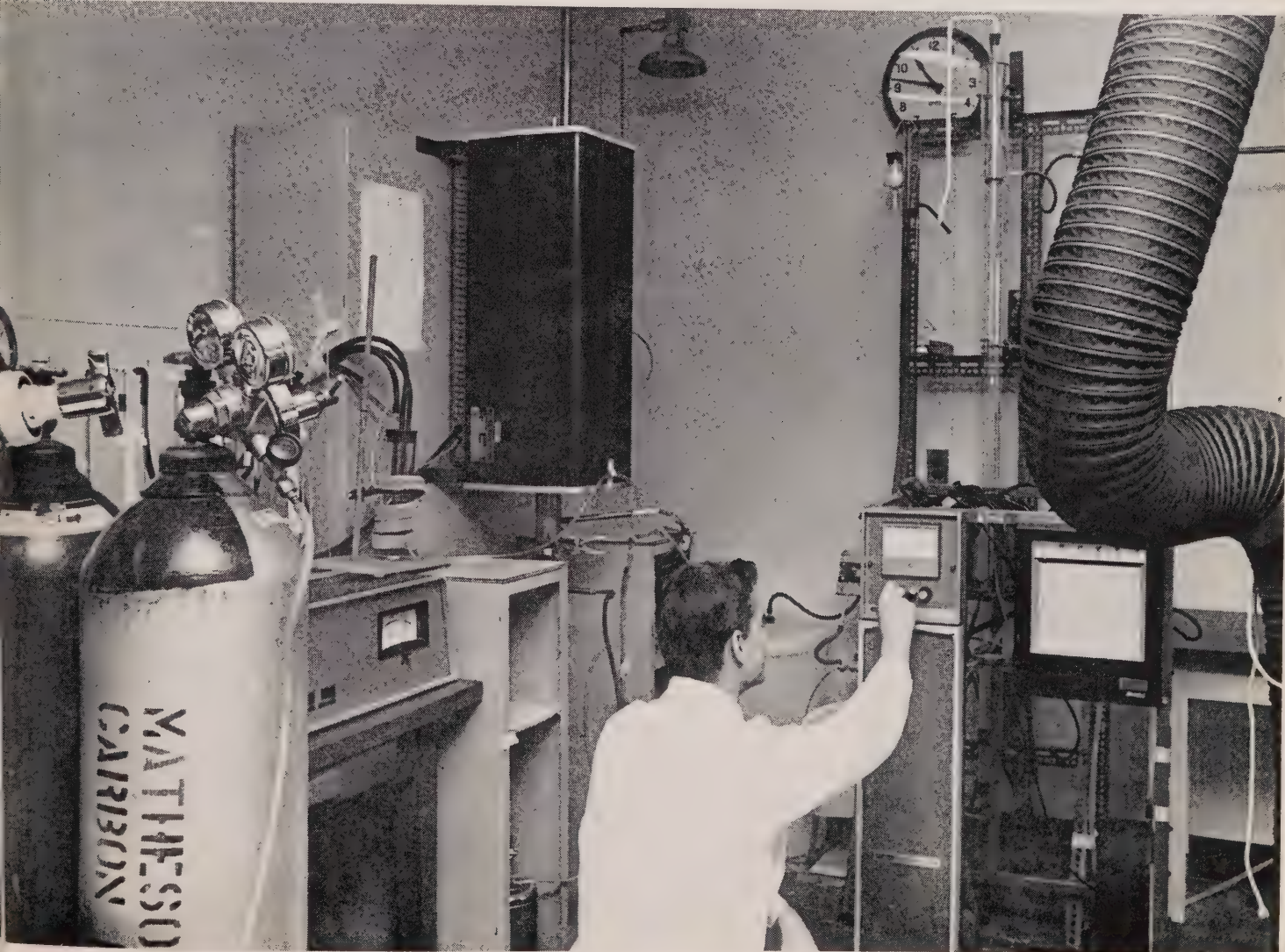
And the sulphur content may be too high to meet future air-quality regulations.

While little more than a laboratory curiosity, one far-out technique uses bacteria to reduce sulphur dioxide to elemental sulphur. The process has been considered since 1945 by a number of investigators although it's unlikely to ever prove suitable in a large thermal-electric plant.

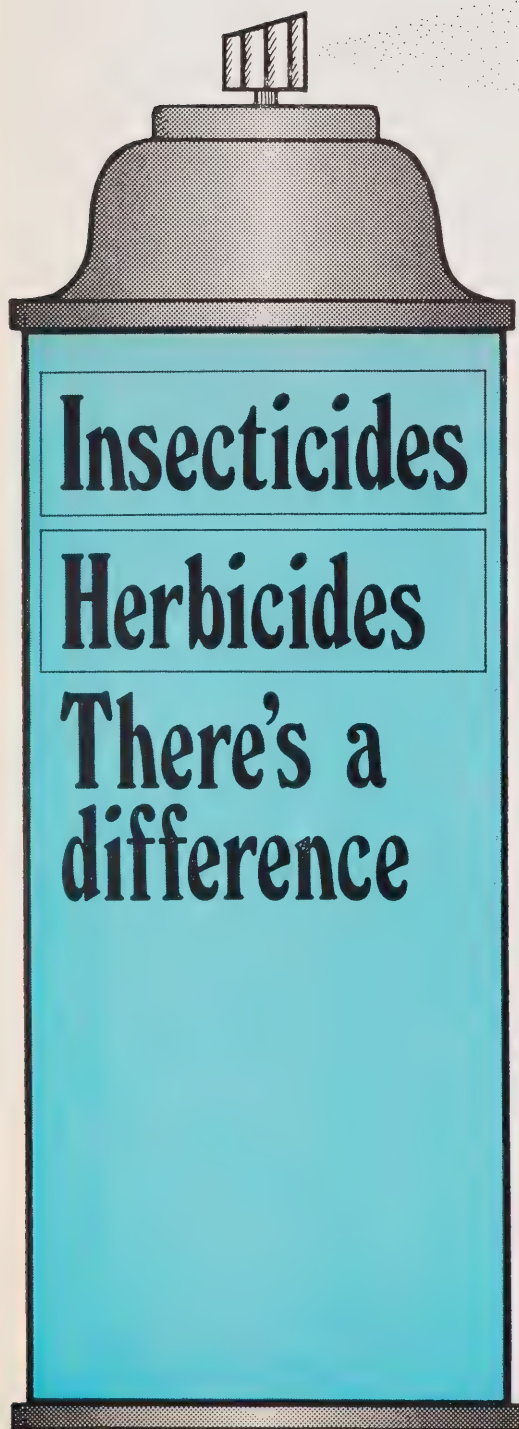
However, Ontario Hydro's pollution experts keep an open mind and are willing to look at any feasible idea. Mr. Harrison is confident that at least one practical process, and perhaps two or three, will be found in a few years which could be adapted to generating units of various size and life expectancy.

But it all takes time. "We will likely have to develop a model-T Ford before we can have a Cadillac," he says.

Right now, his overriding concern is to get on with the job with all the expertise at his command. □







Evidence that DDT injected into laboratory animals had caused liver cancer contributed to the Ontario government last year putting severe restrictions on its use. The chemical had previously been banned in several countries, including the United States, and Ontario Hydro stopped using the insecticide more than two years ago after extensive research and testing of suitable alternatives.

Unfortunately, a great deal of confusion exists in the public mind between insecticides and herbicides. Both are employed in varying quantities by everyone from the giants of agriculture and certain types of industry to the weekend gardener concerned about his fruit trees and the dandelions in his lawn.

By their very nature, insecticides are toxic — some more so than others. Some are highly specific, selecting out only the organism they were designed to kill. Others, like DDT, are more general in their

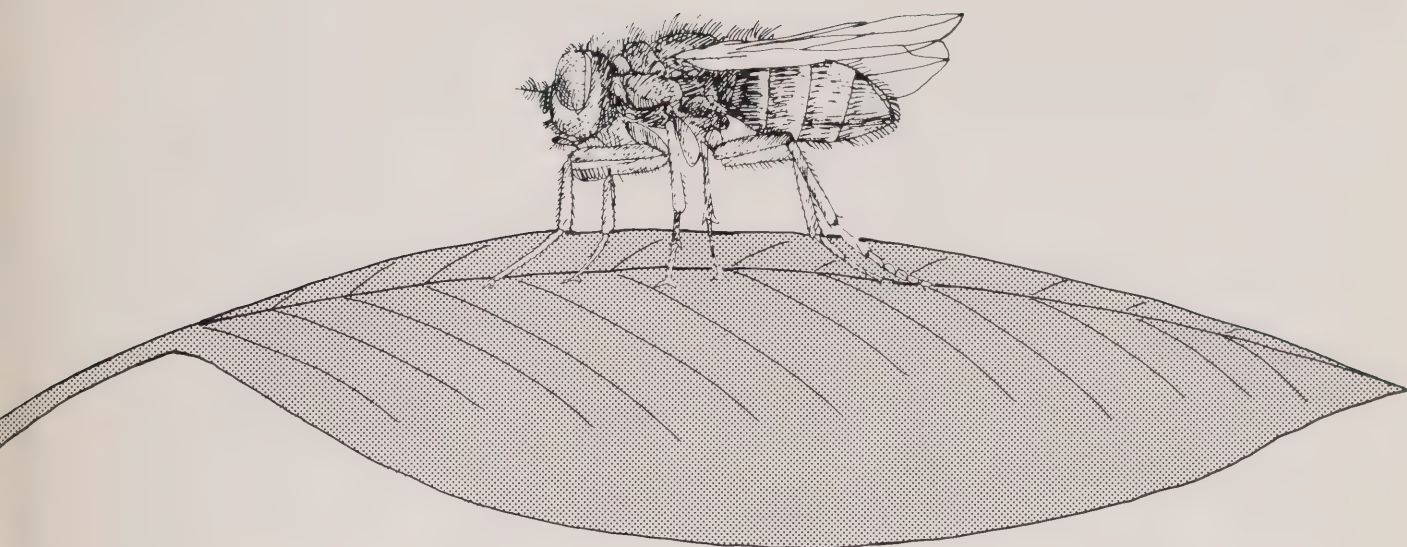
toxic effects while a few are so lethal that mere contact with the skin of a human being can have fatal consequences.

Hormone-type herbicides, on the other hand, operate in such a way as to alter the biological balance within the organism, resulting in an artificial control on cell division. When the herbicide is applied at a specific rate to plants, the production of new cells is so greatly accelerated that the plant dies prematurely.

As with many chemicals, herbicides may be toxic to forms of life other than plants if applied too liberally. But the safety factor is normally many times that of the common insect-killing compounds.

Warnings about DDT — one of the chlorinated hydrocarbon group of insecticides — were sounded eight years ago by Rachel Carson in "The Silent Spring." Miss Carson attacked widespread use of the compound because of the inability of





nts and animals to break it down fast enough to prevent a permanent accumulation in the body fat.

cluded in the vast array of evidence now substantiating her forecast is that of Canadian researchers who recently found high deposits of DDT in Arctic seals. It is thought that northern rivers have washed insecticide into the Arctic Ocean where it is being passed on to the seals through the food cycle.

d, like the seals, each of us has minute quantities of DDT and other man-made compounds in his body. Just how harmful are these small amounts no one really knows. Some ecologists believe the restrictions on DDT may have been premature considering that, indirectly, the chemical has been of enormous benefit to mankind, saving millions from starvation in the last 20 years or so.

the unremitting struggle against blackflies — an area of insect control in which

Ontario Hydro is a recognized leader — war is waged along two fronts. The streams which act as breeding grounds are treated with chemicals to kill specifically the blackfly larvae they contain and, secondly, the adult flies are dealt with by "fogging," or the ground spraying of short-lived chemicals two or three times a week around inhabited areas.

Since its voluntary ban on DDT, Ontario Hydro has experimented with other chlorinated hydrocarbons and also with compounds of the organo-phosphorus group that are both short-lived and more specific. Two of these — Abate, for stream treatments, and a mixture of Malathion and Lethane for fogging — are now in use.

The amounts and type of blackfly insecticides are determined jointly by Ontario Hydro's forestry department, Hydro biologist Ray Effer, the Department of Lands and Forests and the Ontario Water Resources Commission. With the number

of northern hydro-electric sites capable of economic development rapidly dwindling, the use of insecticides is expected to diminish as construction switches to large thermal power stations in Southern Ontario. However, the swarms of insects that would otherwise infest such permanent Hydro communities as Abitibi Canyon, about 60 miles north of Cochrane, will still have to be kept at bay.

"Our construction men will put up with just about anything nature has to offer — anything but blackflies," says Dr. Effer, who is involved with many facets of biological research including insecticides, herbicides, growth retardation chemicals, the effects of air pollution on vegetation and the impact of warm water discharge from thermal generating plants on aquatic life.

Forestry are also doing a great deal of experimenting with herbicides and growth retardants. Much of the present work with herbicides is concerned with deter-



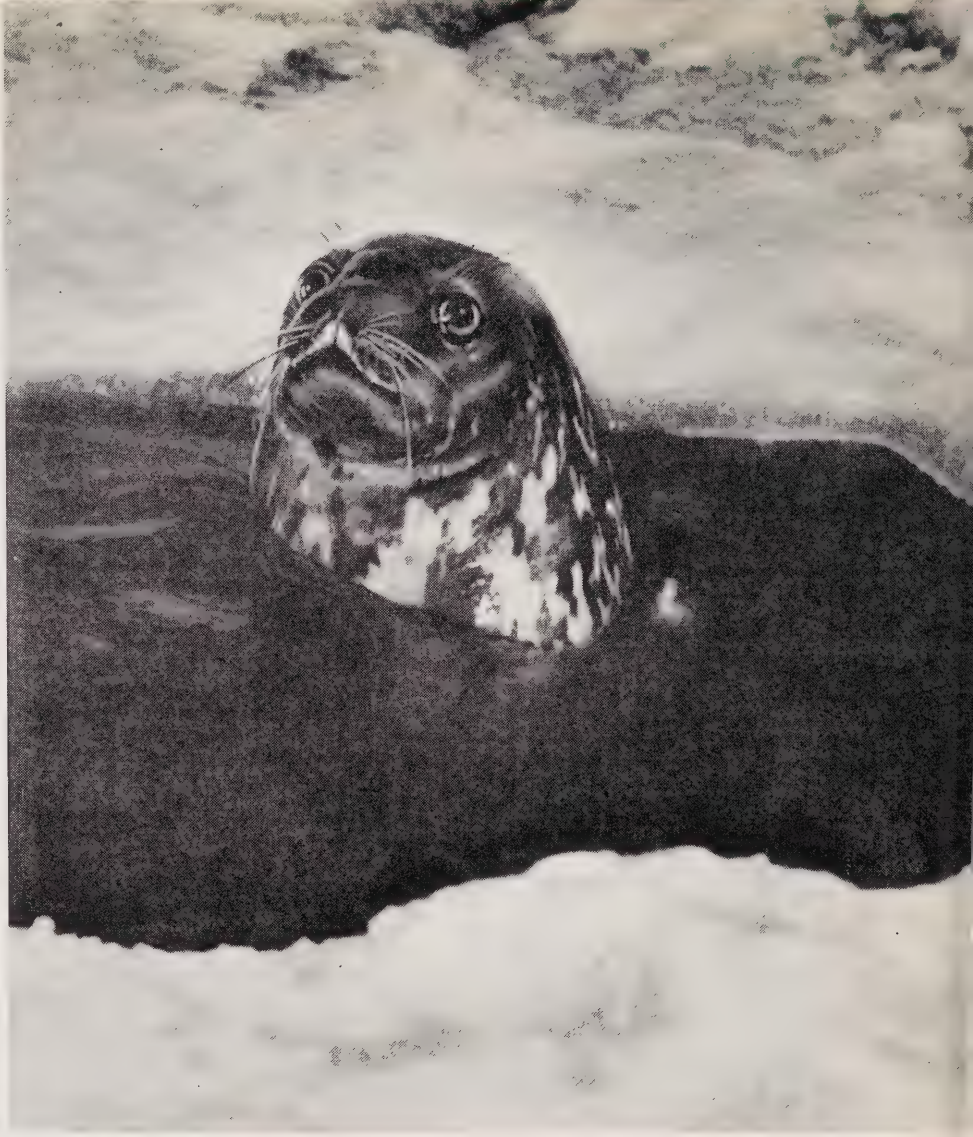


*Traces of DDT are present in humans and animals alike and Ontario Hydro put a voluntary ban on the insecticide more than two years ago. Above: a helicopter sprays non-toxic herbicide along a right-of-way.*

mining what species of plants are affected by available selective herbicides and calculating the minimum amounts to use together with their effect on the environment.

At one time, brush-clearing crews used only scythes, saws and axes along remote rights-of-way, but rapid expansion of the provincial power network after the second world war made manual clearing out of the question. Along with other utilities, Hydro adopted a range of selective chemicals, all of which have very low toxicity and break down fairly rapidly.

Herbicides may be sprayed in winter by switching from water to oil as a carrying material. This prevents freezing. Because of the need to add oil, winter application on woody growth costs more although, at this dormant time of year, the chances of accidentally killing adjacent vegetation are remote.



Drifting is often a problem, even in light winds. And the situation is magnified on rugged rights-of-way when the spraying has to be done by helicopter from an altitude between 60 and 100 feet. Hydro's forestry and research teams worked on a solution from 1959 to 1963, finally coming up with a granulated cellulose thickener which made the herbicide fall in large drops that were less susceptible to drift.

However, use of thickeners has now been abandoned in favor of a 26-foot long microfoil spray boom that is attached to the helicopter's skids.

"We found the thickened herbicides successful but expensive," says Dick McPhail, district forester in charge of vegetation control. "It meant buying mixing tanks and then there was the added cost of the thickener. In addition, the liquid, which had the consistency of paint, lowered the efficiency of the pumps aboard the helicopter."

The microfoil boom, which does not need any thickener, consists of 3,000 nozzles with an inside diameter much the same size as an hypodermic needle. Liquid herbicide emerges from the nozzles as a solid stream then breaks into large drops less subject to drift.

One of the newest and most interesting areas of forestry research is that of growth inhibitors — materials that either slow down the growth of vegetation or stop it almost completely. Experiments with these chemicals, which are frequently naturally occurring substances with no dangerous side-effects, are now in progress at several locations in the province.

Apart from cutting down on spraying operations, a program employing inhibitors would eventually reduce the annual multimillion dollar bill run up by Ontario Hydro and the municipal utilities for pruning trees and otherwise clearing power lines. □



# Sights for sore eyes

by Rae Hopkins

When John Dawson joined Dunnville PUC two decades ago, he found a nightmare tangle of wooden poles and wires. Now a large proportion of the town's power is distributed below ground.



th 58 streets and a population that's "crowdin' 6,000," Dunnville's only a small town. But it's a utility man's dream.

It wasn't always so. When Public Utilities Commission manager John Dawson moved from Woodstock two decades ago, he found a nightmare tangle of wooden poles and wires.

Now there's just a hint of nostalgia on the slightly weathered face as Mr. Dawson, his dark grey fedora pushed forward the crown of his head and his dark windbreaker zippered to the throat, looks out over the banks of the Grand River at his town.

He catches sight of the PUC substation, looking to the left. "That mess has just gotta go—it's an eyesore," he says. He's been looking that for 20 years, and, aesthetically, Dunnville has come a long way in that time.

But the substation is still there. But gone is an old wood pole storage yard in the town and most of the overhead wires. About 80 per cent of the town's 6,000-kilowatt electrical load, about two-thirds of which is industrial, is distributed below ground.

This includes all of the downtown core, new residential subdivisions and a number of older residential areas. Although a 1975 target date won't be met, the utility hopes eventually to have its entire electrical distribution system buried.

"It wasn't easy at first," says Mr. Dawson, who was among the pioneers of underground distribution in Ontario. "Matter of fact, everyone told us it couldn't be done. Everything from impossible to illegal were the reasons when we announced, 20 years ago, that we were going to bury a line from the substation to the Dunnville Boat Club.

"Well, that's a long time ago and we did it. The line's still there and we've never had any trouble with it."

Then, in 1951, came a government announcement that a low-cost housing project was planned for Dunnville. On its heels was a PUC announcement that electrical service to the development would be underground.

"With the subdivision completed and underground electrical service installed and working well, everyone in town wanted underground," says Mr. Dawson.

And that typifies urban Ontario.

Utilities, from Ontario Hydro to the smallest of municipal electric commissions, are devoting more and more attention to aesthetic considerations. Ontario Hydro has launched a five-year intensive study program into ways of improving the efficiency and appearance of high-voltage transmission lines and equipment. Municipal utilities are, generally, putting all new residential distribution systems

underground and steadily converting overhead systems, particularly in the downtown areas.

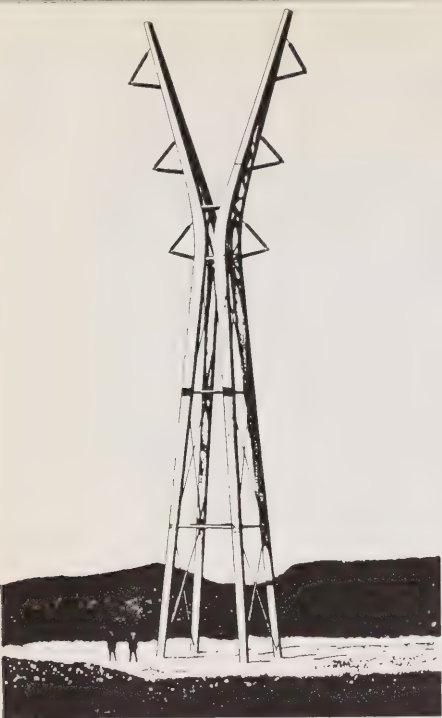
High-voltage transmission is another matter. Ontario Hydro's senior transmission design engineer Neil McMurtrie says one of the first questions whenever a new line is announced is "Why don't you go underground?" Outcries come from public officials and property owners alike at the mere mention of a new tower line.

Surging demands for electric energy have necessitated ever-increasing voltages for the transmission of huge blocks of power to centres of heavy demand. It's not technically possible at the moment to put 230,000 or 500,000-volt lines underground for any distance, and it's not possible at all to bury the 765,000-volt lines that are planned. So Hydro's men of science are looking for technological breakthroughs to make underground extra high voltage systems possible.

And even if it were possible, Mr. McMurtrie hastens to add, the cost of doing it staggers the imagination.

While the trend in most communities is toward underground service in new residential areas, there still isn't a general move to convert overhead plant in older residential districts. One of the problems is that municipal long-term development





*Transmission line towers are likely to take on new and unusual shapes as increasing attention is paid to aesthetics. The one above was designed by Henry Dreyfus and Associates of New York. Right: Like many other centres, Dunnville is gradually eliminating scenes like this in exchange for underground distribution and decorative lighting in its residential areas.*



plans aren't sufficiently clear for utilities to commit the vast sums of money needed to carry out conversion programs.

Too, there are those among the utility men who are not convinced underground service is the total answer to the problem of environmental improvement.

Lloyd Askwith, Ottawa Hydro's assistant general manager, is one of them. Mr. Askwith says he's "not convinced" that by putting everything underground utilities will be free from troubles. "Ice storms, yes, but what of cables being accidentally uprooted or severed? Then, when we do have an outage on an underground system, the cost of repairs spirals.

"Locating the fault is a problem, whereas with an overhead system there's little doubt someone will advise the utility about a downed wire within a very short time. When the fault's on the underground system it can take hours, maybe even days, to find it before the repair can be made.

"That all adds to costs and it really doesn't matter which type of plant you install — it seems to come to the end of the trail in about 30 years," Mr. Askwith adds.

He points out that it's almost impossible to estimate the cost of conversion for any given area because long-range development plans are often "nebulous." For instance, in Ottawa there are designated areas for government use, but with the present austerity program new construction has been delayed. Utilities frequently don't know the magnitudes of loads they will be expected to provide.

"It's hopeless to set a price tag in these times of uncertain cost fluctuations," Mr. Askwith says.

Although Ottawa Hydro is spending about \$600,000 a year on conversions — or far more on underground than overhead plant — Mr. Askwith still has reservations about the immense cost involved.

Streetlighting, utility men the province over point out, is an area where tremendous strides have been made in improving aesthetics. There is an almost universal trend toward mercury vapour lamps to illuminate main streets, residential streets, parks and alleyways. And the key to it all is safety — or protection to both public and property.

New materials such as precast concrete and aluminum or aluminum-painted steel are replacing unsightly wood poles — another indication that utilities are interested in aesthetics.

Ontario Hydro's "five-year plan" is a combined venture involving the research operations, architectural, transmission and distribution projects, system planning and property divisions.

"There are three important reasons for this study," says Jack Cassan, of the Research Division, who's heading the venture. "There's the high cost of land needed for rights-of-way, the need for bigger and more efficient extra-high-voltage lines as huge generators come into service, and there's public pressure for better looking transmission systems."

He predicts that eventually all lines in and around cities and towns will be underground. "But right now, the cost is prohibitive — as much as 15 times more expensive than overhead plant. We can conjure up technical breakthroughs from thin air. Although we're working hard on underground developments, something must be done in the interim," he says.

At present, 230,000-volt lines require about 14 acres of right-of-way per mile and a 500,000-volt line hikes that figure to 20 or 25 acres a mile. A key to the program will be the pursuit of improved insulation methods which hopefully will reduce the size and number of towers needed to carry a line and thus the amount of land required.





answer could be a film of semi-conductive tin oxide on porcelain insulators. "If this material is as effective as I think, it could cut insulator sizes in half, reducing the air gap between conductors and towers and permitting the use of shorter, narrower towers," says J. Cassan.

Different types of tower material — fiberglass, for example — will be considered. If successful, this could mean insulated tower members and smaller clearances. The name of the game is to refine the design of overhead lines to use the smallest area and make the smallest impact possible.

Within five years we should be able to reduce the size of high-voltage towers 30 per cent and cut land requirements in more. This program will answer a lot of questions for us and we'll be in a better position for the next voltage level — the move upward from 500,000 volts."

He sums it up this way: "We must investigate the unconventional."

Utility people are already thinking in terms of "utilidors"—utility corridors to consolidate all services such as Hydro lines, telephone lines, water and sewers. Referring to aesthetic considerations, Ontario Hydro architect Ken Candy puts

it this way: "Years ago, we built hydraulic stations way up in the sticks and aesthetics weren't too important. But today we must turn to thermal-electric generation near heavy population centres where we must make appearances pleasing to the eye.

"And we have to take into consideration noise control and must play our part to help beautify the municipalities in which we build. We must become more conscious of the landscape around our thermal plants.

"People generally are becoming more and more demanding. We can no longer go along with the monstrosity that was a transformer station. We have to build something that will blend in with the future development of urban areas and not stand out as an eyesore," Mr. Candy says.

Ontario Hydro is proving this already with an interesting structure using precast sculptured concrete panels that blend in with Toronto's Charles Street area — and the building's a transformer station.

But to finger the utilities for "visual pollution" isn't quite fair. In the US, according to a White House report of an environmental pollution panel, the problems of the junk automobile and the discarded beer can are only among the more obvious evidence of a general situation resulting from the advances of a consumer society.

"The current junk car problem is generally conceded to be 'visual pollution' rather than a serious hazard to the health or well-being of the nation. Its genesis is primarily economic rather than technological," says the report.

"One topic that should be given considerably more thought is the long-range picture with respect to automobile manufacture and its bearing on the problems of junk cars, solid wastes and other pollutant effects . . ."

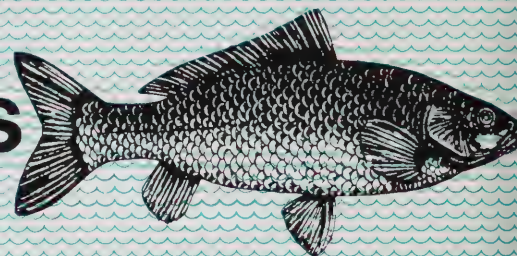
And, says Dr. Glen T. Seaborg, chairman of the US Atomic Energy Commission: "Environment has become an emotionally-charged word these days — almost on a par with words like crime in the streets, student revolts or Raquel Welch, depending on which emotion you want charged."

Says John Dawson: "Tower lines, utility poles and other such equipment take up a lot of space, and they're not beautiful. But neither is a truck. It takes up a lot of space, it's certainly not beautiful and it smells. But until we find a better method for moving bulk power, or bulk materials, overhead transmission networks and trucks will be with us."

Gazing over the banks of the Grand, Mr. Dawson gave a shrug of his broad shoulders and said: "And then, when you see all those TV antennas . . ." □



# it's a matter of degrees



by Bob Morrow

**"Thermal pollution is not yet a major problem. Whether it becomes a problem or a benefit is still to be determined. Governments, municipalities, water and power authorities can determine this outcome before additional thermal plants are planned and put into operation."**  
— Report to International Joint Commission on pollution of lower Great Lakes, 1969.

What pollutes the lower Great Lakes?

The International Joint Commission has published the results of a four-year study which pinpoints sources and quantities of pollutants, evaluates their contribution to deteriorating water quality and suggests remedial measures.

The report, issued September 2, 1969, gives the most comprehensive and authoritative picture of the lower Great Lakes. The 150-page summary of its findings places various types of water pollution in perspective that has been often lacking on a controversial topic which has spawned scores of news stories, articles and letters to the editor.

The controversy has swirled around Ontario Hydro, too, which requires large quantities of cooling water for its thermal power plants. But a realistic assessment of the effects of warm water discharged from coal-fired and nuclear-electric plants should be made in the over-all context of lake pollution.

The IJC's list of remedial measures gives

Canada and the US a set of priorities for cleaning up the lakes. At the same time the IJC also points out potential problems that need attention such as thermal effects, which Hydro engineers say will require intensive research.

"The nature of the enrichment problem in Lakes Erie and Ontario is clearly the fertilizing effect of added nutrients in causing eutrophication," says the IJC report. "The nature of the problem is not that the lakes are dead; on the contrary, it is the abundance of life."

Nutrients such as phosphates and nitrogen accelerate eutrophication or the aging of lakes by stimulating growth of algae and depleting oxygen on which desirable species of aquatic life depend. It's clear that detergents are the main source of phosphates in the lakes and, as it has been demonstrated elsewhere, the aging process can be reversed.

"At the present time it is estimated that 50 to 70 per cent of the total input of phosphorus from all municipal and industrial wastes in the lower Great Lakes comes from detergents," says the report. "It is projected that this will become about 70 per cent by 1986 if no controls are carried out."

For this reason the IJC recommends an immediate reduction in phosphate input as a logical first step and complete removal of phosphorus compounds from detergents "as soon as possible, but not later than 1972."

"Partial replacement of phosphates in detergents is now possible with no reduction in cleansing power," says the report.

An independent US study shows that some powdered detergents contain two three times as much phosphates as competitive brands. Dishwashing liquids and soap flakes have little or no phosphates.

The IJC report says treatment for removal of nitrogen compounds may have to be instituted in the future but control of nitrogen, an ingredient in farm and garden fertilizers which also contain phosphorus, will be more difficult.

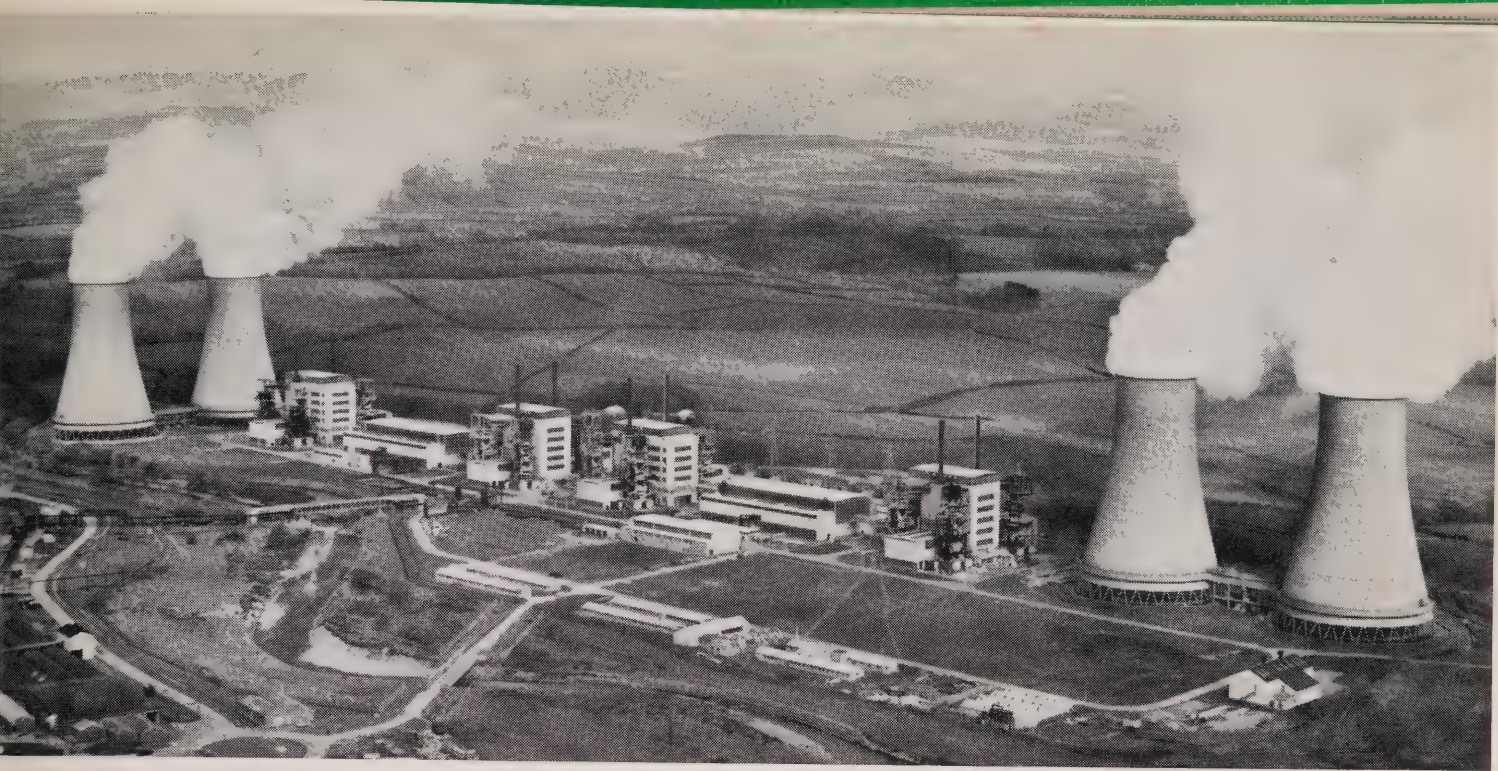
Other types of lake pollution are bacterial contamination from untreated or partly treated sewage, viruses, soil and riverbank erosion, garbage, metals and chemicals dredging and vessel wastes. The sources are municipalities, industries, tributaries, pleasure boats and lake vessels, and sediments from land runoff. No serious problems have arisen from oil and gas wells but they are a "potential source" of pollution.

The report says that whether thermal pollution becomes a problem or a benefit is still to be determined. But in discussing remedial measures the report adds:

"Plans and programs for the location and operation of thermal power plants . . . should recognize both the potential benefits and the adverse effects of waste heat."

The IJC report agrees in substance with





*Huge cooling towers, like these at Britain's Calder Hall nuclear power plant, are necessary if no plentiful supply of water is at hand.*

port issued by the US Federal Water Pollution Control Administration and the New York Department of Health in 1968, which stated: "In Lake Ontario the combined effect of existing plants plus the proposed nuclear-fuel plants was calculated to be impermissible." This report, covering 229 US municipalities and industries, attributed much of the pollution to industries which dump untreated wastes into the lake.

Why then all the furor? Precisely speaking, the term "thermal pollution" should apply to the discharge of heated effluent which causes undesirable effects on a body of water or interferes with the uses made of the water.

Whether the effects of heated water are detrimental, beneficial or insignificant depends on a number of factors. One of the most important is the size of the receiving body of water on which the plant is located. Much of the controversy has spilled across the border into Canada from the United States where a number of power plants have been built or proposed in relatively small lakes and rivers.

Climate, too, plays an important role. Existing water temperatures in semitropical bays or on southern US lakes and rivers obviously make a difference. Remedial measures undoubtedly are necessary on specific sites in the US to protect the environment.

Farther to home, relatively small lakes in the state of New York have limited cooling

capacity compared with the Great Lakes. But the FWPCA has estimated that existing and proposed power plants on Seneca and Cayuga Lakes would "have little effect on the over-all lake temperature, and even this minute increase in summer water temperature would be nullified during the following winter."

The Great Lakes contain enough water to cover all of Canada to a depth of 12 feet. Lake Erie, the shallowest and most highly polluted of the Great Lakes, is 240 miles long, up to 250 feet deep and is covered with ice for several months of the year.

Ontario is indeed fortunate that the Great Lakes system provides abundant supplies of deep, cold water for Ontario Hydro's coal-fired and nuclear power plants. For example, the average intake temperature for Lake Ontario water required by the Pickering nuclear power station will be 52 degrees. It will be raised about 20 degrees by passing through the condensers. A smaller temperature rise usually occurs at fossil-fuelled plants.

A great deal of emphasis has been placed upon the quantity of heat discharged into the water by a 2,000,000-kilowatt plant. However, such figures are irrelevant unless they are related to the size of the body of water and its ability to diffuse heat from man-made and natural sources.

Dr. Ray Effer, Ontario Hydro's biologist, says the total heat input to the lake by such a plant over a whole year is equivalent

to the amount absorbed by the lake in a half day of average sunshine.

For the technically-minded, Ontario Hydro's chief engineer Harold Smith puts it this way: "The average annual rate of heat input from such a plant operating at 0.435 capacity factor is roughly equivalent to the mean annual heat loss due to evaporation from seven square miles of Lake Ontario (0.1 per cent of the area)."

Lake Ontario is one thing. But what about Hydro's 2,000,000-kilowatt coal-fired Lambton generating station located on the St. Clair River south of Sarnia? A comparison seems in order.

As part of its 1970 national power survey, the US Federal Power Commission studied the cooling capacity of the 981-mile main stem of the Ohio River which flows through Cincinnati and Pittsburgh. River flows range from 4,000 to 20,000 cubic feet a second.

At the present time there are 40 steam-electric plants on the Ohio River with an aggregate capacity of 18,000,000 kilowatts. However, the FPC says that as long as new plants are spaced about 25 miles apart, "it appears . . . that the Ohio River could supply (once-through) cooling water for nearly 60,000,000 kilowatts of new fossil-fuelled capacity or 40,000,000 kilowatts of new nuclear-fuelled capacity, providing other major thermal discharges are not made. The FPC says, however, that cooling towers or



ponds may be necessary if power plant sites are closer together.

In contrast, the St. Clair River has an average flow of 177,000 cubic feet per second — at least nine times the cooling capacity of the Ohio. Average flows of the Niagara and St. Lawrence rivers are considerably higher.

For some years cooling towers have been used in Britain where streams are small and inland water is scarce. More recently they have been installed by US utilities on lakes and rivers with limited cooling capacity.

Cooling towers are usually about 400 feet high and 300 feet in diameter. The Tennessee Valley Authority's Paradise steam plant on the Green River in western Kentucky has three 437-foot high towers. Each of them is large enough at the base to hold a football field.

Wes James, of Ontario Hydro's recently-formed generation concept group, says that a 2,000,000-kilowatt station would require eight of these concrete towers, necessitating purchase of considerable additional land for a site.

Mr. James estimates that cooling towers would also result in lower turbine efficiency, loss of power to run tower pumps and fans, and add substantially to annual operating and maintenance costs.

Aside from costs, it's possible that cooling towers would create severe fog and icing conditions during the Ontario winter. Two University of Texas researchers are investigating the droplet size distribution in fog from a cooling tower as an air pollution problem. "This type of fog causes reduction in visibility and icing along roads in many areas of the country," said Torsten Rothman and Joe O. Ledbetter in an interim report last June. "It is therefore desirable to control the emission of such fogs."

More research is required to answer two other important questions: Will warm moist air given off by a cooling tower chill stack gases at fossil-fuelled plants and accentuate ground level pollution? And will ice coat switchyard equipment and cause power interruptions?

The Federal Power Commission has criticized the appearance of cooling towers and has pointed out that once-through cooling systems involve the least noticeable change in the natural environment.

"Whether of the mechanical or natural draft type, cooling towers involve large structures that are generally unsightly," says the FPC.

"Because of their size and great height . . . natural draft towers are not aesthetically

appealing . . . little can be done to blend them into the natural environment."

However, Mr. James says if Ontario Hydro had to locate a thermal plant on a small inland stream or lake, cooling towers or a cooling pond would probably be necessary. A 2,000,000-kilowatt plant would require a cooling pond three to four square miles in area.

Concern has been expressed that heated discharge water may stimulate the rate of aquatic weed growth which, as the IJC study indicates, is primarily nourished by phosphates and nitrogen from detergents and fertilizers.

At certain locations this is a valid concern. But Lakeview generating station studies conducted by Dr. Effer on a type of filamentous algae called cladophora — the most troublesome weed in the lakes — indicate that growth both builds up and dies down earlier in warmer water. "Over-all weed production seems to be similar at each temperature," he said.

Preliminary studies on other aquatic weeds suggest that cooler water is more conducive to active growth during the summer and early fall.

The studies demonstrate Ontario Hydro's concern about the potential effect of warm water discharge. Nanticoke generating station, located near a prime smallmouth bass fishing spot, will discharge 600,000 gallons of water a minute from its condensers. This will be mixed with 400,000 gallons pumped straight from Lake Erie for cooling before being returned to the lake.

Ontario Hydro is conducting extensive studies in co-operation with the Ontario Water Resources Commission and the Department of Lands and Forests to find out what are the effects of warm water on the lakes.

Environmental studies include a detailed look at plantlife in the area around the Nanticoke station; temperature and current studies; experimental fishing, fish tagging and netting; aquatic weed growth observations and water sampling.

Similar studies are scheduled for the site of the proposed oil-fired Lennox generating station on Lake Ontario near Bath and the Bruce nuclear power development at Douglas Point on Lake Huron.

The studies will be made two years before and at least two years after the plants are in operation.

Concern has been expressed, too, about the possible depletion of dissolved oxygen by warm water discharges. Year-long Lakeview studies indicate, however,

that oxygen depletion is insignificant and at Nanticoke is expected to be less than one per cent.

The controversy over thermal effects has stimulated a great deal of research into potential problems, particularly in Britain and the United States. These studies underline the importance of studying the environment at each site to determine the potential ecological impact of thermal discharges on a body of water.

In fact, the possible impact on the ecosystem is becoming a factor along with many others which are taken into account when a specific site is under consideration.

Ontario Hydro is now making efforts to project the size of the plume of warm water which tends to spread over the surface of the lake from thermal plant outlets. Studies here and elsewhere show that heat is rapidly given off to the atmosphere as it leaves the plant. The aim, of course, is to work in partnership with nature to disperse the heat harmlessly into the atmosphere.

While close attention is being paid to potential hazards, there is a great deal of evidence that fish can adapt to gradual changes in water temperature up to a certain point.

In the US, a major ecological study on the sluggish Delaware River revealed that the best winter fishing was near the water outlet of a Pennsylvania power plant. Tiny Bennett, an ardent fisherman who writes an outdoors column for the Toronto Telegram, reports excellent angling off the Lakeview plant. In his column, Mr. Bennett said he and two friends caught "a dozen or so carp there in one evening" and called it the "best 100 yards of freshwater fishing in the Toronto region."

In the United Kingdom, a number of fish hatcheries use the warm water discharge from Central Electricity Generating Board stations. In the USSR, heated water is being used for raising freshwater fish on a site covering several thousand acres. Aquaculture, as it's called, is a highly-developed science in eastern countries where more than 2,000,000 tons of fish are produced annually by this method.

Wider recognition is now being given to other beneficial effects of waste heat. A three-year program was started in 1973 in Oregon to study the feasibility of using warm water for irrigating a 170-acre demonstration farm. Commonwealth Edison's 2,600-acre cooling lake for its 1,200,000-kilowatt Kincaid station is being developed by the State of Illinois for recreation. Montrose Lake in Missouri is a cooling water reservoir for Kansas City



over and Light Co., has excellent fishing and duck shooting.

Heated water can also be used to improve winter navigation. An experiment using warm discharge water to extend the navigation season on the Potomac River was reported to be successful. And an Atomic Energy of Canada Limited official has suggested that the St. Lawrence seaway season could be extended by strategically siting nuclear-electric plants between Buffalo and Montreal.

Looking to the future, the potential effects of waste heat on water supplies will undoubtedly be increased as thermal-electric plants increase in number and size. System planners predict that by the year 2000, single stations may be producing as much as 12 million kilowatts to meet the apparently insatiable demand for electric power.

Engineers say the long-term answer to a buildup of warm water discharges lies in developing either new or improved methods of generation which make more efficient use of heat. AECL is working on

designs for nuclear reactors which will increase their efficiency by 10 per cent to 15 per cent, thereby reducing the amount of waste heat.

It's significant that the efficiency of coal-fired plants has been increased 2½ times over the past 40 years and greater efficiency can be expected. Prospects for more efficient energy conversion include addition of more heat recovery cycles and high temperature blade cooling.

Technology offers prospects for development of more efficient gas turbines, fuel cells and magnetohydrodynamics (MHD) which may not require any cooling water. MHD is a method of generation which converts heat generated by a nuclear reactor or other means directly into electricity.

In the final analysis, the growing concern over all types of water pollution has been a positive benefit itself. People have been alerted to the need stressed for many years by conservation authorities to preserve our water and land resources, and a sense of urgency has led to many corrective measures. More will be necessary,

but in our haste we should not overlook preservation of wet-lands to make desirable habitats for duck and geese and of weedbeds which are the best fishing spots on many lakes.

The problem of the future is for technology to work hand-in-glove with nature. But, as Scientific American pointed out in a major article on water discharges and aquatic life, "thermal pollution has not yet reached the levels of producing serious general damage . . . unlike many other forms of pollution, any excessive heating could be stopped on short order by appropriate corrective action."

No one has all the answers to complex environmental problems, but the quest for solutions based on our increasing knowledge is on. Scores of research projects into thermal effects, now under way in all major countries, will help Hydro to ensure that its operations will have no harmful effects on our water resources and how, in fact, they can be beneficial to the environment. □

*United Kingdom's Central Electricity Generating Board operates a fish hatchery in the marginally warmer waters of this artificial lake adjacent to the Trawsfynydd nuclear plant in North Wales.*







*Receiving long-service certificate from Ontario Hydro commissioner J. D. Fleming, right, is Cayuga Hydro chairman E. S. Allen.*

# CABLE TV

**may be key to big-city loneliness, OMEA delegates hear**

Cable television may be the key to the problem of loneliness in Canadian cities and provide a new sense of local and national unity, says Harry J. Boyle, vice-chairman of the Canadian Radio-Television Commission.

"I'm convinced that a large proportion of the people in this country will be joined by some kind of electronic umbilical cord and the question is whether this will serve to drive people away from each other or draw them closer together," Mr. Boyle told 150 delegates attending a District 5 Ontario Municipal Electric Association meeting at Stoney Creek.

While the CRTC had no particular feelings of aggrandizement or power, Mr. Boyle said that local cable services should not be an imitation of what already existed

in television. He expected all kinds of people and all kinds of occupations would become involved in this new communications venture.

And while he spoke, twin TV cameras from a local cable company whirled away producing a videotape for later viewing in the area.

Mr. Boyle expressed fear that the introduction of cable television could accentuate the feeding of US programs to the Canadian viewer. He said Canadians are not culturally deprived of US programming and that many of the prime time shows are American, sponsored by American corporations. However, he cautioned that the CRTC must be careful not to build "an electronic Berlin Wall" between two progressive nations by curtailing the trans-

mission of US programming into Canada.

Among the problems faced by cable enterprises, he said, were the enormous cost of establishing a coast-to-coast network and what would happen to existing communications systems. "I think Canada has within it the key to a future communications system, although I'm not convinced that it will turn out as people expect," Mr. Boyle said.

G. D. Zimmerman, president of Telecommunications Limited, said the introduction of cable TV opens up new areas of opportunity to local talent, which otherwise would not get sufficient exposure to the viewing public. He added that cable will "help break down the communications barrier between Canadian cities."

## Defeat voluntary

A Lynden Hydro resolution calling for voluntary amalgamation of electrical utilities involved in new regional municipalities was defeated.

The resolution sought election of a regional commission representing the entire area within a new regional setup.

D. Gordon Robertson, Lynden Hydro chairman, said he didn't feel it economically feasible for small utilities to continue to operate under the regional system. He added that outsiders (the Steele Commission) had gone into the area and recommended amalgamation.

"We who know about Hydro and how it works should be the ones to talk about pooling our resources. Smaller utilities cannot afford to train personnel. There's only one way to progress — get larger."

The resolution followed on the heels of a regional government panel during which





*Heading up District 5 of the OMEA are: Standing: S. Baldwin, Ancaster; Andrew Frame, Burlington, past president; Lorne Reeder, St. George; D.G. Robertson, Lynden, and F.R. Kaupp, St. Catharines. Seated: H. A. Howard, Thorold, secretary-treasurer; George Butcher, Simcoe, second vice-president; W. S. Jennings, Niagara-on-the-Lake, president; S. J. Chapple, Stoney Creek, first vice-president, and D. P. Cliff, Dundas, honorary vice-president.*

Participants took a lengthy look at the hydro operation in the new region of Niagara.

George Burley, chairman of the Niagara region task force, said that so far nothing has changed in the operation of electric service in the new metropolis. He said his committee is studying ways and means of integrating service with the new region and that now there's strong indication that hydro service will be operated by a municipal Hydro commission.

Apparently, everyone concerned favors either 11 commissions (one for each municipality in the expanded region) or one central commission, he added. The biggest problem facing the area, he said, is the financial arrangements for the take-over of local service operated by Ontario Hydro. Reporting the findings of the engineering sub-committee, Parnell Matthieu, of Beamsdale Hydro, said only four of the commissions concerned have engineering personnel and the remainder rely on Ontario Hydro for their engineering needs.

However, he said, Ontario Hydro feels adequately staffed to provide this service because most of its engineers are used to working with high-voltage transmission problems and generation projects. "Private consulting firms are few and far between in the region," he added.

Frank Kaupp, St. Catharines PUC, chairman of the management and personnel sub-committee, pointed out there are 368 utility workers in the region, including 106 Ontario Hydro area office personnel. He suggested that if a central commission is established it would be an elected one with capita representation. He estimated the cost of a central body to be about \$700,000 and said that over a period of time power rates could be standardized and the labor

problem simplified with the creation of one bargaining unit.

C. J. Austrom, Chippawa Hydro, said at present the alternatives seem to be 11 commissions; a rural system and six commissions; a rural system and one commission; and one central commission.

Mr. Burley called on each member municipality to submit a brief to the task force for consideration.

## Still flexible says Kerr

The coming of regional government will have considerable effect on the operation of municipal utility commissions and in some cases there's little doubt that responsibility for electrical service will be turned over to a committee of council, George Kerr, Minister of Energy and Resources Management, told delegates.

Mr. Kerr said it seems fairly obvious that in those areas of the province where regional government is introduced there will be a subsequent consolidation of commissions and a reduction in the number of commissioners.

"But," he added, "this whole question is still in an extremely flexible state. Just as there are different forms of regional government planned for different parts of Ontario, there may well be different approaches tried to the public utilities aspect of these revisions."

Mr. Kerr said pollution control will be the issue of the seventies just as surely as education was the issue of the sixties or highways construction was the issue of the fifties.

"Social attitudes everywhere are changing. In the past, smoke from industrial

stacks and Hydro stacks meant prosperity and full employment. Today it means air pollution," he said. And he added that "a line of transmission towers once meant the opening up of new areas in our province to development and progress. Today it means protests from indignant property owners and conservationists who want these lines diverted around their properties."

Mr. Kerr said he has been deeply conscious of the importance of resolving the differences between these two divergent views and goals. He has often been the target of Opposition criticism in the legislature for "wearing two hats" in this regard because of his dual responsibility to control pollution and to ensure that Ontario Hydro meets its power commitments.

"Even if that criticism was justified, I think the combined role gives me an opportunity to see both sides of the pollution control problem in Ontario and to work out acceptable and satisfactory programs which will meet our objectives."

He pointed out Ontario Hydro has spent more than \$40 million on air pollution control equipment and would be spending a great deal more. The controversy over the 700-foot stack planned for the Richard L. Hearn generating station on the Toronto waterfront has shown the tremendous impact that pollution control can have on operating costs and ultimately on the cost of power.

"We feel that nuclear power is the key to both adequate supplies of electric power and to more effective pollution control. The joint committee on atomic energy of the United States Congress has compiled impressive statistics to support its argument that nuclear power, despite drawbacks, is the best bet for pollution-free energy," Mr. Kerr said.



# along hydro lines

## Electronic trouble-shooter

Ontario Hydro plans to install an IBM 1800 computer at its Richview control centre to monitor transmission lines in its East System as a means of early detection of trouble spots on the vast power network.

The use of an electronic brain to keep a finger on the electrical pulsebeat of power grids appears to be the universal "in thing." In about two years Hydro will install a much larger machine to monitor its entire network — the East and West systems combined — in a much more sophisticated operation.

Elsewhere, the USSR has put a multi-purpose BESM-4 computer into operation at the joint power grid department of the Trans-Caucasus.

The Russians claim that the electronic brain, capable of performing up to 20,000 operations a second, has already helped solve a number of power distribution problems and opens up new and great possibilities of resolving a "wide range of problems connected with enhancing dependability and economy of the USSR's unified power grid."

And from south of the border comes word that the Minnesota Power and Light Company, among others looking to the computer for assistance, has installed a telememory control system which allows a mini-computer to make routine checks of its entire electrical system while freeing dispatchers and operators to focus all their attention on critical situations. □

## Whole life was hydro

Ottawa Hydro's general manager Fred G. York died last month. He was 60. Mr. York, who had held the post since 1954, began his career with the utility in 1926 as a summer student at McGill University.

Following graduation in electrical engineering in 1935, Mr. York went to work as a lineman with Ottawa Hydro and subsequently served as a substation operator, line foreman and succeeded his father, the late John G. York, as the utility's distribution superintendent.

Mr. York was 1961 president of the AMEU. W. Ron Mathieson, the AMEU's secretary-manager, says Mr. York's greatest contribution to the association was his solid support and his assumption of the role of chief critic.

"Fred York was one of the last of the old characters whose whole life was Hydro in Ontario and who'd never back down from an argument. And he never had any use for a yes-man," Mr. Mathieson added.

Mr. York's son, Robert, is employed as an engineering assistant at Ottawa Hydro and his son-in-law is one of the utility's meter readers. His father-in-law, Frank Plant, was 1950 president of the OMEA. □

## Hydro Charlie

"Hydro Charlie" is still active in Chesley. C. J. Halliday, who celebrated his 94th birthday last month, was instrumental in bringing electric power to Chesley in 1916 — earlier than most towns in the district.

A son of the late Mr. and Mrs. Duncan McNabb Halliday, was born in Chesley and ran a clothing and grocery business there until his retirement 30 years ago. For many years he served on the local Hydro commission, as well as terms as a town councillor and mayor. He was also an elder in the United Church.

In spite of his 90-odd years, Mr. Halliday is always on the move. Like last summer, for instance, when he built a boat, launched it at Port Elgin and sailed up the lake to Oliphant where his summer home is located.

The Halliday name has been known in Chesley since 1816 when D. M. Halliday moved here from Renfrew County where his family first settled in 1816.

## Writer with a flair



*Reporter makes the news*

A correspondent for the Meaford Express, Dorothy Crysler, been named 1970 winner of the Ontario Hydro award of merit for excellence in rural news reporting. James A. Blay, the commission's retiring director of public relations, presented the award at the Ontario Weekly Newspapers Association convention in Toronto.

As well as covering the Beaver Valley area for the Express for the last two years, Dorothy operates a large apple orchard in Clarksburg for her brother, is secretary of the Beaver Valley Chamber of Commerce and is active in the Georgian Bay Fruit Growers' Association. She's described by her editor, W. W. Brebner, right, as a 52-week-a-year correspondent with an original writing style.

## COMPEC comes to Lambton

COMPEC — an agreement which provides for a common approach to marketing and the sharing of costs for sales staff — has been signed at Point Edward by Ontario Hydro and municipal utility officials in four Lambton county communities.

Signing for Ontario Hydro were Western Region manager George Currie and Lambton area manager Frank Archibald. Managers and secretaries of Brigden Hydro, Wyoming Hydro, Point Edward PUC and Courtright Hydro signed the pact calling for the municipal utilities to contribute \$2 per customer annually.

For the fee, Ontario Hydro agrees to provide specialized sales staff and carry out sales campaigns for the municipalities at the local level. Key to the Co-operative Marketing Plan for Electric





togetherness

ommissions is to achieve a uniform marketing plan coupled with uniform rate structure within the municipalities.

Seen at the COMPEC-Lambton signing are: Mr. Archibald; D. O'Brien, Wyoming Hydro; Mr. Currie; Mrs. A. M. Marsh, Bigden Hydro; T. D. O'Brien, Wyoming Hydro; J. A. Bannister, J. Edwards, Point Edward PUC; L. S. Steadman, Brigden Hydro; M. Lester and R. Walton, of Courtright Hydro. □

## Too much beef a poor bet

Employers should think twice about hiring the job applicant who is overweight, sedentary, bites his finger nails, chain smokes or reveals a family history of heart disease. He could be a poor health bet, says Dr. D. K. Grant, Ontario Hydro's director of medical services.

Dr. Grant told a symposium on heart disease in Toronto that the way industry can reduce the costly loss of key men through heart disease is through careful selection.

"Men of muscular body build are most predisposed to heart attacks, while tall skinny men are least likely to get a heart attack," he said.

He added that employers should be careful of high tension jobs such as the clammy handshake, the bitten finger nails, and the compulsive talker. Another suggestion he tossed out was an "obtrusive once-over" of the prospective employee's wife to cause a happy home life is most important.

Companies can greatly influence the maintenance of health among their workers by instituting a four-point program — examination, exercise, education and rehabilitation. Dr. Grant said regular medical examinations should be made of any workers known to have heart disease or who are in a high-risk category because of obesity, diabetes, high blood pressure, heavy smoking or family history.

Medical advice, he added, can help eliminate some of these risk factors. "Encouragement of exercise can help promote health. While education is necessary to inform people about the dangers of high-calorie diets and lack of exercise. Young people should be warned not to gulp down greasy french fries, and with a sweet drink often as an appetizer after school or work, before going home to a hearty dinner and an evening of watching television," Grant said.

He pointed out that management can play a vital role in the rehabilitation of workers who have had a heart attack by its attitude and co-operation in helping the victims to get back to work. "The company should also ensure that the worker has someone to take care of his family during his illness, which will greatly increase his incentive to recover and relieve his anxiety." He added that 75 to 80 per cent of individuals survive a heart attack and three-quarters of these return to a normal job. □

## Utilities spend \$60 million

Ontario Hydro last year approved capital budgets for the municipalities totalling some \$60.7 million, or about eight per cent of the

total value of the electrical plant and facilities of the utilities concerned.

While many utilities were able to finance extensions and improvements to their distribution systems from current revenue, 44 found it necessary to borrow approximately \$11.7 million through bank loans or the issue of debentures.

Ontario Hydro also approved major adjustments in retail rates for 127 municipal utilities. Of these adjustments, 121 involved an increase in rates and 74 included a new general rate applicable to commercial and industrial customers. At the end of the year, 172 municipal utilities had adopted the general rate first introduced in 1966. □

## PR prizewinners



Top communicators

The public relations theme of the municipal utilities, "Tell the people," is catching on. Proof was in the presentation by the OMEA and AMEU of awards for effective communications programs with customers, municipal councils, news media and other members of the community.

Receiving plaques and certificates on behalf of their utilities are R. C. Wardlaw, Etobicoke Hydro (large utilities category); C. S. Richardson, Meaford PUC (small utilities); Ontario Hydro Chairman George Gathercole who made the presentations; Ross Lamb, Oakville PUC (medium utilities); T. S. Anderson, Windsor Utilities Commission, and F. R. Cross, Nepean Hydro, both with honorable mentions.

Even the plaque is indicative of its purpose. The town crier's bell occupies a place of prominence on it. □

## New job for D. J. Gordon



Douglas J. Gordon, who was last month named Ontario Hydro's deputy general manager, brings a great deal of administrative experience to his new post. He has been assistant general manager — marketing since 1964.

A graduate in electrical engineering from Queen's University, Mr. Gordon joined Ontario Hydro's municipal department in 1945 after service with the Royal Canadian Navy. In 1948 he was named consumer service superintendent of Toronto (now Central) Region. Three years later he returned to Head Office as assistant municipal service engineer and in 1953 became municipal service engineer.

In December, 1958, he was named manager of the Consumer Service Division and in June the following year became director



of Consumer Service. In April, 1961, Mr. Gordon was made executive director — marketing.

The new deputy general manager is a member of the Association of Professional Engineers of Ontario, the Toronto Electric Club and the Toronto Board of Trade and is second vice-president of the Canadian Electrical Association. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

By its own definition, it's impossible to predict an accident. It is possible, however, to plan a course of action to be taken should an accident occur, according to the latest section of the handbook "Public Relations for Hydro Utilities".

The confusion that follows a serious employee accident may also be compounded by emotional reaction and administrative uncertainty. The best way to avoid these pitfalls is to have a plan, ensure that all employees are familiar with the plan, and set up the machinery to carry it out. Easy as it may sound, it is wise to develop it as soon as possible, and to subject the plan to frequent review to make sure it accommodates the changing community in which a utility operates.

No one denies that the first concern is assisting the victim and summoning medical attention. The areas that also require attention include organizing help at the scene, notifying the next-of-kin, informing other employees, dealing with news media, and questions of liability.

Called "Accidents are Unwelcome News," this section has been distributed to each municipal electrical utility in Ontario.

\* \* \*

Power interruptions are unwelcome news, too, but most electrical utilities have come to realize there are positive advantages to announcing a planned interruption in advance to their customers. The announcement often includes an apology for any inconvenience that may be caused, and an explanation of why the interruption is needed.

Meaford PUC have taken this procedure one step further. When they are planning an interruption to electrical service, the utility manager prepares a brief letter explaining the circumstances, and supplies any affected motels with enough copies for each of their guest rooms. Out-of-town guests are thus as well informed as local residents. And they're likely impressed with the thoughtfulness of the local utility, too.

Even those residents who choose to leave are not ignored by Meaford PUC. Each customer who is moving from town receives a letter expressing appreciation for the opportunity to serve him. Enclosed in the letter is a card introducing the customer to the municipal utility in his next community.

Impractical, perhaps, to pursue these policies in a large municipality. Nonetheless, they illustrate the kind of imagination and rapport that smaller utilities can achieve in their own special way.

\* \* \*

"What do you people do with the money I pay you?" inquired the customer. "I'm glad you asked," has been the response of several local utilities who have made it a practice of issuing annual progress reports in recent years. Based on a simplified financial statement and a brief review of major events of the previous year, these progress reports are tangible evidence of the shareholder aspect, an important part of the relationship between a utility and its customers.

Recognizing this expanding activity, the Public Relations Coordinating Committee is making available this month, to each local utility, three suggested techniques for producing a progress report. First is a pamphlet that can be mailed to each customer. Second is a typical advertisement for publication in a local newspaper. The third choice, designed primarily for small utilities with few customers and no local printing shop, is a three-page typewritten report that can be distributed over the counter. They answer the customer's question about money.

## municipal briefs

**George Conn**, Ontario Hydro's municipal accounting co-ordinator who will have served the commission for 40 years come September, has taken early retirement for reasons of health. Mr. Conn, who joined the municipal audit department in 1930, became one of the first regional accountants in 1948 in the original Niagara Region, where he remained until 1961 when it was merged with the former West Central Region. He later returned to Head Office. **Owen Sound PUC's** electrical superintendent since 1946, **Alex McLinden**, retired last month. Alex is a nephew of the late **Joseph McLinden**, who was the PUC's first general manager and who earlier worked for Owen Sound Illuminating and Manufacturing Company, which was in large part responsible for bringing electric power to the town.

**Twenty-Four St. Thomas** PUC workers have added a little color to their hard hats. They were recipients of Electrical Utilities Safety Association hard hat safety decals for working a full calendar year without a lost-time accident.

**Wallaceburg Hydro** literally subscribed to the "tell the people" public relations theme of the municipal utilities. A number of larger power users were invited to an "information meeting" in town recently where they were told about the use of electricity, its cost and ways and means of controlling that cost. For the encore, representatives of smaller industries are being invited to a second "Hydro think-in."

**Arthur Meen**, only member of the Ontario legislature who is both an electrical engineer and a lawyer, has been awarded the Sonoma Martha medal by the Association of Professional Engineers of Ontario. The medal is awarded to "engineers who have served their profession diligently for many years through the professional association. . . ." Mr. Meen, a former chairman of North York Hydro, a past president of OMEA District 4 and former head of the provincial association's government legislation committee, was elected York East MPP in 1967.

**Harrow-Colchester South** Chamber of Commerce has named former Harrow Hydro chairman **L. F. Ounsworth** citizen of the year. Mr. Ounsworth has moved to Ottawa. He was a town councillor from 1949 until 1959 and mayor from 1960 to 1964. Ounsworth was appointed Hydro chairman in 1964, a post he held until his move. The chamber presented him with a plaque to commemorate his service to the community.

**Waterloo PUC's** former secretary-treasurer **George Woods** is richer. Mr. Woods, who retired in 1967 and lives in Hespelton, acts as the commission's historian and clips newspaper accounts of meetings for a scrapbook. His annual stipend for this service is \$1 a year, payment of which was approved at a January 1968 meeting.

**The Corporation of the Town of Mississauga** has appointed **John Adams**, former chairman of the Mississauga Public Utilities Commission, to sit on the new three-member commission. The appointment follows the resignation of **Elmer Wright**, a former president of OMEA District 4.





Nostrils were aquiver all over downtown Toronto the other day when a new and so far unidentified odor of extreme pungency permeated the atmosphere — already rich with the heady perfume of a modern industrialized society.

Telephone company switchboards were besieged with anxious inquiries as the all-pervasive aroma began to seep through office windows and through the streets in section after section. Described variously as resembling the smell of rotting fish or very ripe eggs, the mysterious miasma was thought by some to emanate from the carcass of a monstrous prehistoric mammal washed up on the shore.

Subsequent investigation revealed nothing larger than the odd dead smelt and the finger of suspicion swung back to normal in the direction of the much maligned Hearn plant. All innocence, the lads there were given a clean bill of health and the source of the smell remains a mystery.

We like the way one radio station newscaster ended his report on the affair: "It seems unlikely now that the persons responsible for this brutal assault on our noses will ever be brought to heel. Whoever it was — shame on you."

Come to think of it, we did hear a kind of rumbling noise in the sky that day and the jolly green giant is known to be partial to beans.

If there is any unanimity of opinion at all in the whole murky business of pollution it is to be found in the area of allotting responsibility. Everybody knows that somebody else is to blame. And yet there is some pretty disturbing evidence to suggest that the individual, even he with the rudest anti-pollution tonsils, is not entirely spotless.

According to one expert, each of us in the course of a year contributes to the environment half a ton of waste body products, 200 gallons of lead-content fuel, 200 gallons of sulphate-content fuel and 45,000 gallons of polluted water. The water is the real shocker since it seems to follow that the cleaner we keep ourselves the more dirt we thrust upon others. If so, then we can probably contribute more to the solution by leaping out of the bathtub than by viewing the neighbor fellow with vociferous alarm.

It's not exactly a fragrant prospect, but the time may come when anyone whose presence cannot be detected at some distance by the nasal senses will be singled out as an object of scorn.

Besides, any change in social behavior likely to reduce the use of detergents and other cleaning agents will ultimately react to the good of our lakes and rivers. We may all end up with dermatitis but our fish will be clean and healthy.

And what about all those grapefruit rinds and empty pickle bottles we so generously donate to the sanitary engineers on Tuesdays and Thursdays? According to the Commissioner of Works, every man, woman and child in Metropolitan Toronto generates 1,400 pounds of garbage in the course of a year. This adds up to about 1.5 million tons of used groceries and other second hand household goods. Something of a panic is developing with regard to disposal.

Plans call for a \$10 million incinerator on an Etobicoke site but more than 1,000 residents have signed petitions declining the honor. They go along with the principle of the thing but suggest the infernal machine itself would be better located adjacent to people of a less discriminating nature.

And so the story goes. It's much like the electric power situation. "Give us the power, boys, and plenty of it," cry the multitudes, "but use a little discretion." As far as we can figure out, this means build your generating stations and transmission lines but do it in the other fellow's neighborhood.

The exception proves the rule, of course, and we were captivated by an account in an English journal about one stout chap who moved because the electrical authorities had dismantled a nearby transmission line. So enamored was he of the towers' geometry that he relocated in a veritable forest of cable and steel. "Among his most prized possessions," according to the report, "is a collection of pylon etchings."

On a similar theme, the Electrical Review suggests that one day people will be as nostalgic about transmission line towers as they are today about windmills and steam trains. It quotes from an address to the British Association: "When the pylons are dismantled and the cables finally go underground, people will think again of these majestic catenary curves and remind each other of how giants once marched across the countryside in dead silence and single file."

Now, if Hydro can find a lady of the same convictions and persuade her to join forces with one of these gentlemen, many of its environmental problems will be solved. Any undesirable side effects from in-breeding would be a small price to pay for a new race of tower lovers.

All our life we've been hammered with the message and guided by the principle that gasoline and alcohol just don't mix. Now it appears that they do, or should, and in the interest of cleaner air of all things.

As an anti-pollution measure and to reduce farm surpluses, the president of the United States is being urged to support the mixing of gasoline and grain alcohol to produce a cleaner motor vehicle fuel. Proponents of the scheme point out that as much as four million bushels of grain could be used annually for this purpose and that the resulting blend, consisting of 25 per cent 200-proof ethyl alcohol, would reduce hydrocarbon emissions by as much as 50 per cent.

Sounds marvelous. Fancy being caught in a traffic jam behind a bus burning top grade Old Granddad. Or a whole city bombed out of its mind in a blanket of over-proof smog. Even if it

didn't reduce pollution very much it should at least make it more enjoyable.

And don't think for one moment you can escape pollution by spending the rest of your days indoors. Alarmists were quick to block this avenue of escape by suggesting that everything from house paint to gas stoves and hairsprays are capable of bringing some of the less stalwart to their knees.

In our January column we had a few sly observations to make with regard to a mysterious malady in England which bowled over meter readers for the electricity boards like ten pins while their confreres with the gas companies went on their rounds unscathed.

To quote our favorite writer: "Competition is stiff enough over here, but so far even the gas people have drawn the line at germ warfare."

Now we're not so sure. According to a short item carried by Canadian Press last month "about 14,000 Toronto Hydro users will be paying estimated bills this month because a mid-January flu epidemic incapacitated about 25 per cent of the city's meter readers."

Again, those gas fellows appear to have escaped and it looks pretty suspicious. It's to be hoped the blue flame boys will be required to conform with the unconditional ban on the use of viruses and other nasty microbes for the purpose of incapacitating the enemy.

Chemical warfare is generally considered to be a degree or two more humane than germ warfare but we don't like the sound of that dish the bio-chemists are cooking up at the University of Western Ontario . . . with the help of natural gas. If you're the venturesome kind, though, you might ask the waiter for a side order of graphium fungus next time you tie on a bib at the local hash house.

What is the main ingredient? It's an edible fungus similar to the mushroom and if you haven't noticed it around that's quite understandable. The stuff is usually found in sewage and the man who plays first test tuba at the university has found a way to make it multiply faster than a pair of rabbits. His secret is to expose it to a mixture of natural gas, mineral water and compressed air.

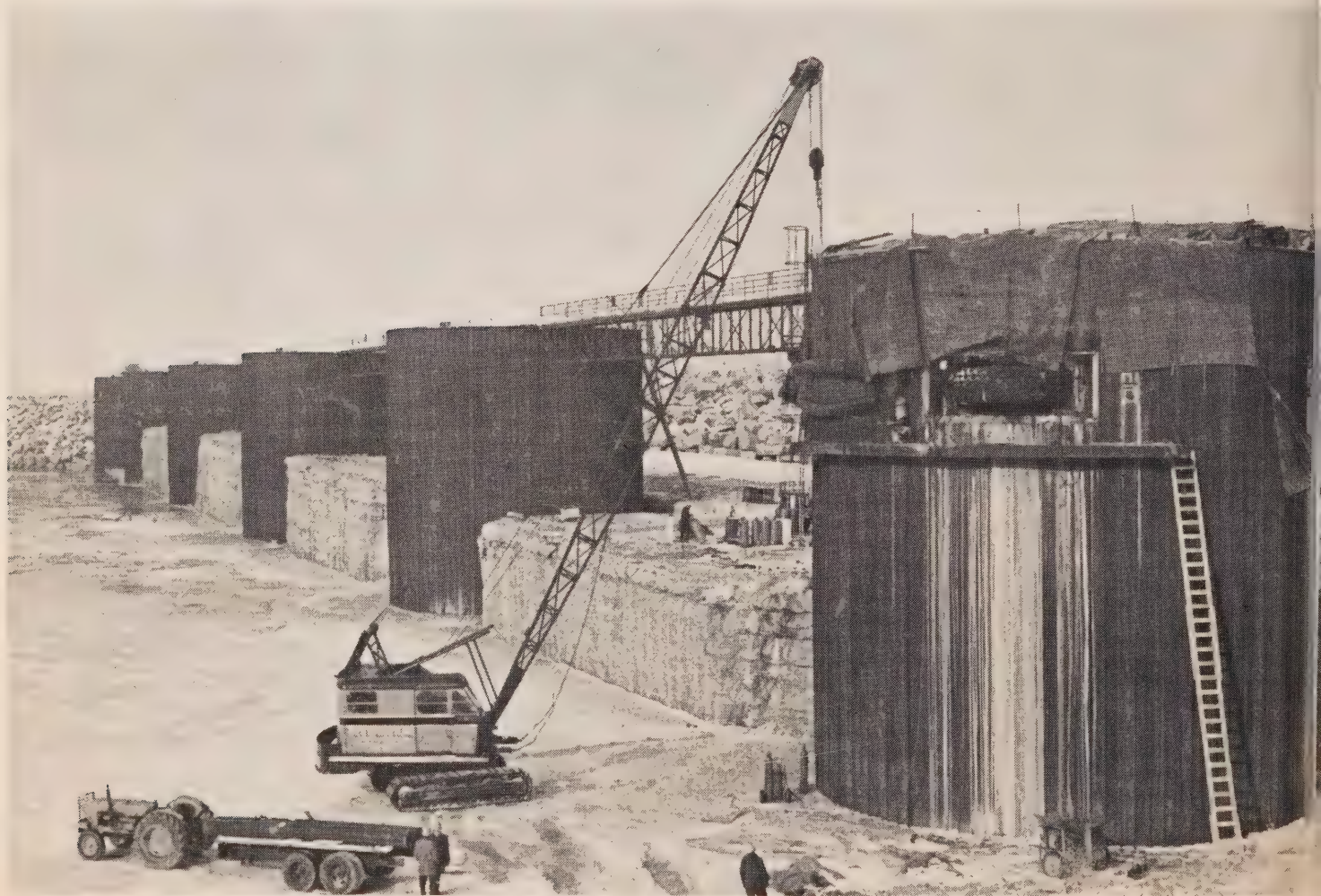
This mouth-watering tidbit contains 58 per cent protein by volume and is said to resemble hamburger meat and to taste "very pleasant." The fungus feeds on natural gas "much as humans do on food," explains the alchemist inventor and he's applied for a patent.

For our part, we'll take our chances with the more conventional hamburger on the assumption that its ancestors were not sewer dwellers. □



## power hunger

Ontarians have a king-sized appetite for electric power. To help relieve the hunger pains, Ontario Hydro has authorized an unprecedented generation construction program costing about \$2.5 billion. A huge tire and a third of a mile of rubber fenders will protect dock structures at the 4,000,000-kilowatt Nanticoke generating station when ships start delivering coal to the Lake Erie plant — one of the world's largest.



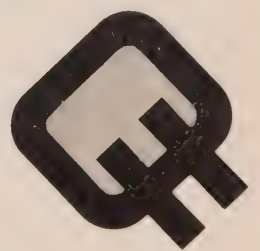


the cat snatchers •  
seeing crime  
in a different light •  
away with the bullpen •

Continued  
from p. 1



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april/1970





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### the cover

Removing a cat from the top of a power pole may be a hazardous business for experienced linemen, let alone amateurs. Now a great deal of thought and time has gone into the development of a device to snare poled cats from a safe distance. See story on page 14.

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## Viewpoint

# the atom in perspective

Among the many important questions we can expect to have answered during the 1970s is whether or not Canada is on an optimum course leading to a reliable and economical source of power from the atom.

And in the face of the controversy and negativism now beclouding the issue, it is important to keep the central facts in focus while the question is being settled on the drafting boards of the designers, in our factories, on the construction sites and in the control rooms of the operating stations.

Most of the criticism of the unique Canadian approach to nuclear power stems from difficulties encountered in the production of heavy water and from operating problems at Douglas Point – Canada's first full-scale nuclear station.

While the heavy water program got off to a disastrous start in the Maritimes, production of this essential component represents no insurmountable difficulties and the over-all nuclear concept is not likely to founder for any lack in this direction.

Frustrating and persistent as the problems have been at Douglas Point, it is important to recognize that these have been mechanical in nature – brought on by component failure and minor design shortcomings. Nothing has occurred to suggest that the basic concept is unsound and the station has been making an important contribution to Ontario's power resources.

It should be borne in mind, too, that the reasoning behind the bold and imaginative decision to embark on an all-Canadian approach remains as valid today as it was at the outset.

Without a nuclear arms program and the associated, immensely costly fuel-enrichment facilities, but with the world's richest supply of uranium and the nucleus of a scientific team developed in war-oriented nuclear research, this country had much to gain by taking the independent course it chose.

Aside from all considerations of prestige and national pride, the potential economic advantages were great. Our unfavorable balance of payments with the United States was a serious problem and nuclear-electric power was regarded as a means of reducing growing dependence on the US for coal. Nothing was to be gained by adding enriched fuel and all the other costly nuclear paraphernalia to our list of foreign shopping items.

More positively, there were very obvious benefits to be had in developing a thriving nuclear industry within our own boundaries with the creation of thousands of jobs in manufacturing, design and associated research. Self-sufficiency in the nuclear-electric field seems likely to become even more attractive in the light of negotiation shaping up for a continental approach to energy development.

It is still too early for anyone to say which of the several nuclear systems being pursued in the various countries will prove superior. More likely, low-cost power from the atom will be reached by different routes.

Meanwhile, doubt and uncertainty seem to increase in direct relationship to the distance from the site. The scientists and others immediately involved with our nuclear power program remain unshaken. The challenge, as they see it, is one of stamina and perseverance in working out the bugs.

The power of positive thinking is recognized as a real and palpable force influencing everything from inflation to good health. As much as anything, our nuclear program needs a transfusion of faith and a showing of confidence at this vital stage in its development. □



# shedding light on crime

by Rae Hopkins







*Left: John Dawson has plotted the relationship between streetlighting and the accident frequency in his home town of Dunnville. Above: well-lighted parks and other open areas serve to discourage night prowlers.*

Aubrey Potter has steel-grey hair, narrow eyes which reflect deep concentration, a silver moustache, a warm, friendly smile, a firm handshake and a passionate dislike of "the lousy punks who go around bashing little old ladies on the head while snatching their purses."

He's Inspector Aubrey V. Potter, head of the Metropolitan Toronto Police department's information bureau and a veteran of 31 years' service as a Metro policeman who's run the gamut from a beat "cop" to the morality squad, criminal investigation bureau and homicide detective.

And of late, Inspector Potter's had plenty to raise his ire. Purse-snatching appears to

be the "in" thing nowadays with the Metro average running at more than one a day since the beginning of the year.

Not too long ago, a 65-year-old nurse became Metro's 65th victim when she was hit on the head as she unlocked the door to her east end home. Her attacker fled into a park nearby, taking with him her purse containing \$165.

On the same night another woman was grabbed from behind, thrown to the ground and relieved of her purse containing only a \$1 bill. And so the story goes. From his thick file, Inspector Potter notes that the incidence of crime is on the increase — about 15 per cent a year. In the

column headed, "All other robberies, including purse-snatching," the figures show a jump of 100 offences in a single year.

"They're the type of criminal who prey on little old ladies on dark street corners," he says. "Purse-snatching's got to be one of the most despicable of all types of crime. More often than not victims injured, sometimes quite seriously, by a few punks who want to get a buck without working for it."

Both police and lighting experts agree that the purse-snatcher, mugger, rapist, break-and-enter artist, amateur car thief and would-be criminal of all sorts have something in common — a fondness for cover of darkness as a tool of their trade. Inspector Potter, for example, will only park his 1966 model Chevy under a street light or in front of a well-lighted store if he goes out for the evening. And he always locks it.

John Dawson, outspoken chairman of the Association of Municipal Electricians' Utilities streetlighting committee, says "Streetlighting in Ontario isn't worth a damn — it's nothing more than disturbing the darkness."

"And that's just as true in subdivisions where homes cost \$100,000 and more as it is on skid row," he adds.

Mr. Dawson takes streetlighting seriously. He's romping all over the world at his own expense, just to see what they're





ector Potter

ing in other countries to make streets safe  
people at night. He's attended all  
ds of seminars on streetlighting and  
relationship to crime and from one in  
ashington last year he brought back a  
ort that 20 well chosen and well sited  
etlights do as much good to prevent  
e as the addition of a policeman – and  
ne-twentieth of the cost.

first line of defence against rape,  
ging, purse-snatching and other  
-dark crimes of violence, streetlights  
operate all night for about two cents.  
ashington, an area was sealed off  
lighted from every possible angle to  
ce the murder rate. It worked.

In a recent survey taken in 25 metropoli-  
tan areas across the US, 96 per cent of  
police and safety officials questioned  
agreed that streetlighting guards against  
attacks by night. Ninety-two per cent  
thought streetlighting an excellent deterrent  
against vandalism and another 88 per  
cent said that marked reductions in petty  
larceny and rape can be achieved through  
improved lighting. Clearly, the survey  
indicated, adequate streetlighting increases  
the effectiveness of police patrol work.

One of the surveyed cities reported that  
hoodlums lurking in the shadows of bushes  
and trees plagued residents of a low-cost  
housing development for months. With  
the addition of improved lighting, the  
incidents all but ceased.

What's true in the smaller population  
centres is also true in huge cities. In Detroit,  
a 30 to 50 per cent reduction in crime  
rates in high-violence districts was  
recorded after illumination levels were  
improved. In St. Louis, street crimes  
dropped 40.8 per cent, auto thefts were  
down 28.6 per cent and business burglaries  
by 12.8 per cent in the first year of a  
large-scale downtown lighting program.

It isn't even necessary to survey police  
chiefs, town fathers, utility people or  
illuminating engineers to determine the  
value of good streetlighting in the preven-  
tion of crime or protection of the public.  
Housewives will say the same thing.

For example, in Roosevelt, Utah, 30  
determined women rose to the cause of  
better lighting in a drive to fight crime  
and traffic accidents plaguing the tiny  
community. In Homer, Alaska, the local  
Women's Club demanded and received  
new lighting after a 49-year-old woman  
was struck and killed by an automobile in a  
poorly lighted area.

Of course, there's more to streetlighting  
than meets the eye. There are three major  
types of lighting – main street, roadway  
and residential – and there's a host of  
others including lighting for parks and  
back lanes. But they all have one thing in  
common – or should have – mercury  
vapor lamps to replace the old incan-  
descent bulbs.

Main street lighting is exactly what its  
name implies: lighting to beautify the core  
area and attract business into town.  
Roadway lighting is intended to illuminate  
busy traffic arteries beyond the range  
of vehicular headlights to guard against  
accidents. Residential lighting is "people  
lighting," which is where Mr. Dawson loses  
his cool. "In my not-too-humble opinion,  
there's too much emphasis placed upon  
streetlighting and very little, if any, in many  
municipalities, put on people lighting,"  
he says. Automobiles are equipped with  
headlights so you don't need lighting for  
them in a residential area. The merchants  
will look after the main drag – they want  
the business. But it's the people in the



*Adequate lighting can help forestall thefts from rolling stock and parked cars; attacks along deserted pathways. Properly designed and installed, it can be highly decorative as well as functional.*

residential areas who suffer. They want, and pay for, comfort. They want to see a light illuminating the sidewalk and their property. They want to know that it's safe to walk the streets at night. They want protection.

To achieve this, Mr. Dawson advocates a general conversion to 175-watt mercury vapor lamps hanging in a downward position and protected by a plastic lens. "They cost about the same to operate as the outmoded incandescent models," he says.

Side-mounted lamps stop about half the light going where it is required — on the street. Plastic fixtures will repel stones. Even .22 calibre bullets will pass right through a plastic lens without shattering it and it costs a lot less to replace the bulb than the lens.

In Chicago they're buying streetlight fixtures on the basis of how much vandalism they will withstand. The plastic fixture heads the shopping list. Everyone knows about vandalism in Chicago or Detroit. But it's typical Ontario, too. Take Port Colborne where, in a single week, 60 fixtures were smashed by juveniles with a pellet gun.

Talking about crime in general, veteran Toronto police reporter Jocko Thomas says crooks got away with \$18 million worth of loot in Metro Toronto last year and what it would be for the province as a whole hasn't ever been calculated.

The losses in stolen or damaged property are just a beginning. To keep a prisoner in the "pen" costs about \$6,000 a year and one policeman may cost the taxpayers about \$300,000 over his career in salaries and benefits. Based on a population of 7 million, it costs each person in Ontario about \$18 a year to maintain the province's police forces — only a portion of what crime is actually costing the taxpayer.

In Dunnville, Mr. Dawson's home town, the 570 streetlights cost about \$20,000 a year to maintain. In the same municipality it costs close to \$15,000 to keep a policeman on the beat for a year.

Police, especially in Toronto, encourage improved lighting of all sorts. Inspector B. C. Coles, who heads the Metro police break-and-enter squad, has long been an advocate of household lighting timing devices and the leaving of lights and a radio on when absent from the home.

He insists that the floodlighting of indus-



trial complexes is a "must" to cut the crime rate. Many in Ontario are heeding his advice, including his superiors. The Metro police headquarters building on Jarvis Street is floodlit and "there's hell to pay if anyone forgets to turn the lights on."

He answers the question of proper lighting as a deterrent to crime with another question. "How many muggings do you hear about on Yonge Street?"

Inspector George Holmes, head of the auto recovery bureau, agrees that proper streetlighting is definitely a deterrent to the amateur car thief. However, his biggest "beef" is with apartment owners. Under-

ground garage lighting, he says, is disgrace.

Statistics show that a majority of the thefts of contents from automobiles Metro Toronto have taken place in poorly lighted apartment garages and a vast number of cars have been stolen from same dim places.

And the last word from Dunnville Police Chief G. A. Rowe: "If I were to give you police work tomorrow and go into business there are two things I'd have. First, more than adequate lighting because it's good inexpensive protection. Second, I'd get myself a damn good German shepherd dog." □







It all began 20 years ago with the  
manufacture of corn cob pipes.  
Today this Wallaceburg firm caters . . .

# *strictly for swingers*





white-coated craftsman extracts a crisp new dollar bill from his wallet and places it delicately on the golf club head. He watches his finely adjusted scales slowly tip. "That's all it takes to make a difference," he says.

The difference was one-sixteenth of an ounce. But for Eric Wade, 47 years a golf club maker, even that's too much. He's a perfectionist, one of several who specialize in the custom manufacture of sports equipment for the Wallaceburg firm of Hillerich & Bradsby Company, Inc.

Manchester-born Mr. Wade first started making golf clubs in Victoria, BC, in 1922 — 20 years after emigrating to Canada. Now, nearly half a century later, he's making them for this firm on the Sydenham

River, about 20 miles south of Sarnia. To Mr. Wade, producing a made-to-measure club is like fitting a man for a suit. He tailors the product to the specifications of those individuals who want something different from the manufacturer's regular stock.

Almost all the golf clubs manufactured annually at the Wallaceburg plant are sold exclusively through golf professionals' shops. But it's the requests for special hand-built clubs that land up on Mr. Wade's cluttered workbench.

"A trifle more loft . . . a bit more upright grip. You wouldn't believe some of the requests I've had," he adds.

With dividers, lie detectors (not the type used in criminal investigation), callipers,

files and scales, he goes to work facing, shaping, grinding, weighing and polishing until he senses it's just right. And with 47 years' experience, simply swinging a club and sighting along the shaft can tell a lot.

A little more weight in the head, a little less length in the shaft, an adjustment to the angle of the face and that golf professional in BC won't have to alter his grip or swing to avoid slicing.

Only a short walk separates the golf from the hockey department at Hillerich & Bradsby, but going from one to the other is like passing into a different world. Behind is the controlled, almost clinical atmosphere of Mr. Wade's domain; ahead a dusty, bustling cacophony — a fact only too well emphasized by the screaming of saws and the whine and whirl of polishing, buffing and branding machines.

Of course, the regular model of stick just won't do for the professional hockey player. "They're hard to keep satisfied," says Walter Anderson, who with 30 years' experience behind him is the man top players go to for their hockey sticks.

"When they're not scoring, they blame the stick and come to me," says Mr. Anderson with a chuckle.

Professional clubs like the Toronto Maple Leafs order sticks made to a particular pattern. For individual players, the specifications are more exact. A lighter stick, a thinner handle, a special curve of the blade, all require the attention of a craftsman. So Mr. Anderson picks out the wood and with all the skill at his command sands, polishes and shapes the stick to order.

Under the name of Wally Enterprises, the firm started out nearly 20 years ago with the manufacture of corn cob pipes.

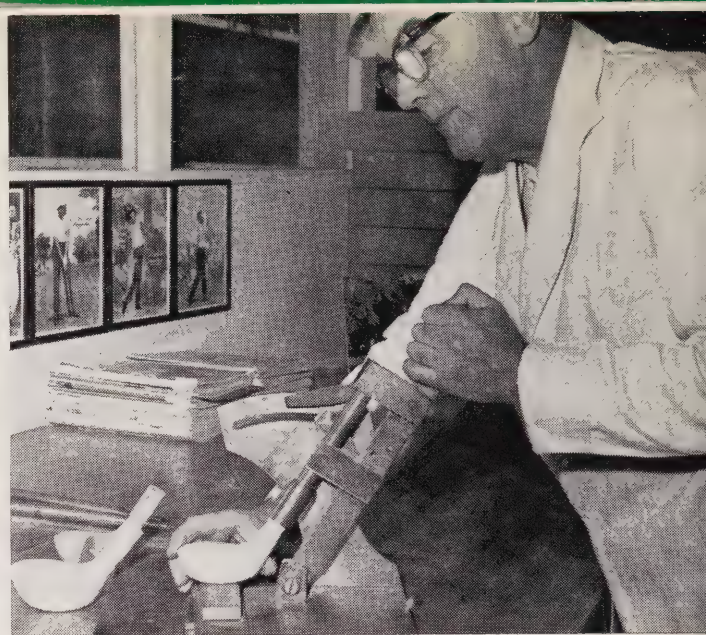
At that time, St. Thomas-born Jack Lacey — now the firm's general manager — started out in a small room above a garage in downtown Wallaceburg. Expansion followed and the firm started making baseball bats for the Louisville, Kentucky, concern of Hillerich and Bradsby, makers of the "Louisville Slugger." With the subsequent purchase of the Ingersoll Hockey Stick Co., Wally Enterprises went into the hockey business. Four years ago they became an affiliate of Hillerich and Bradsby.

They now make golf clubs, hockey sticks, pool tables, baseball and softball bats, employ salesmen from Vancouver to Newfoundland and export to the US, Australia, England, Switzerland and South Africa.

ory and photos by Mike McAteer







smooth but do not alter the surface of the face. The precise angles of loft, horizontal and vertical roll of the master model must be retained.

Similar care and precision are needed to obtain the near-perfect iron head. Any roughness from the forge must be removed by careful grinding. Facing, scoring and polishing precede weighing on delicate scales to ensure that specifications are met.

Shafts, mostly of steel, are fitted into the heads. After binding, lacquering and polishing, the golf club is then ready for that early morning 18 holes.

Although not quite as exacting, the mass production of hockey sticks and baseball bats also requires the experience of men who know their material.

Fine white ash for the hockey stick handles comes into the plant in rough unfinished five-foot lengths. In early days, sticks were carved from one piece of timber. Although some hickory and beech is occasionally used in the manufacture of baseball bats, nearly 90 per cent of the wood is ash.

It all calls for skilled craftsmanship. But then, the products are for swingers of a different kind. □

*Craftsman Eric Wade measures lie of a made order golf club. Left: baseball bats receive the company brand and hockey sticks get a lacquer bath.*

## at the double

For a town of its size — population 11, — Wallaceburg has an astonishing variety of industry ranging from brass and iron foundries to plastics. But dominating all is the huge concern of Dominion (which has earned this community — an inland port near the mouth of the Sydenham River — the title of "glass town of Canada.")

"When I first came here I was amazed by both the diversity and number of industries," says the manager of Wallaceburg Hydro, M. Duffus. "We have about 30 different concerns, and these account for 80 per cent of the load."

The growth of the town's load has been phenomenal. In 1964, the peak was a 10,000 kilowatts. It is now nearly 21 kilowatts, showing a growth rate about twice the provincial average.

In town there are five plants which do chrome plating, a canning plant and manufacturer of cans. A plastics firm makes parts for cars was built in 1966 and has been extended twice since then. Illustrative of the speed at which things move is an aluminum die-casting company which was a mere hole in the ground in March, 1969. It was operating on three shifts by mid-August. □

The timber, most of it ash grown in the states of New York and Pennsylvania, comes across the border for milling at Sutton, PQ, or goes direct to the Wallaceburg plant. The wood is either kiln-dried or air-dried before manufacturing begins.

The business of transforming a block of wood into a polished product is an intriguing affair. Although machines play their part in streamlining operations, deft hands are essential.

Golf club heads, for example, are fashioned from a block of persimmon — chosen for its hardness, strength and beauty. Working at a lathe and guided by an iron master model, the operator profiles the block into a head. Treatment with a moisture-repellent oil follows and face inserts and protecting soles are built in.

Facing is one of the most exacting operations. Sure strokes with a fine-mill file



# boss loses his status symbol in office revolution

by Lois Lane







People are supposedly more important than their surroundings, but looking around many office buildings today you'd never know it.

The emphasis, unfortunately, is more frequently on material objects and their position with the people thrown in as a second thought. It's still not unusual to see underlings sweating away in the bull-pen — that windowless inner area — encircled by plush executive suites.

But, currently, there's a new look coming to the Ontario scene. The idea, called office landscaping, solves some of the problems

of where to put whom and why by simply eliminating the old concept of regimented rectilinear partitioning and all the status that went with it.

Office landscaping is being tested in Ontario Hydro's engineering building in Toronto and, if successful, will be employed in the new head office, construction of which has been temporarily deferred due to the credit squeeze.

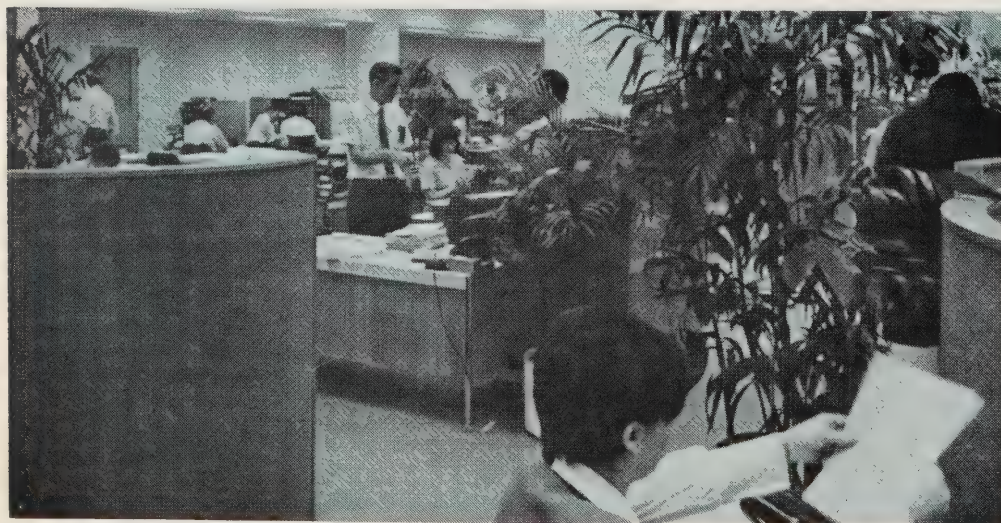
On the ground floor of the engineering building, the interior walls have been torn down to transform a cluttered rabbit warren into a tastefully decorated, airy

space that is home to the engineers working on the Nanticoke generating station. The area contains 89 people in 9,300 square feet of space, or 105 square feet per person.

Office landscaping places groups and individuals near those with whom they communicate, thus presenting an irregular pattern to the viewer. Noise reduction is an important factor and sound-absorbing materials are used in the ceilings and walls. Low, movable carpet-covered screens of gold-and-orange blend are arranged around individual work stations to provide a degree of privacy. Carpeting matching the screens and white window drapes help to deaden sounds as well as add to the pleasant scene. Light oak desks, book cases, wardrobes and storage cabinets are complemented by multi-colored upholstered chairs.

"People tend to be clutterbugs," says Ken Candy, Ontario Hydro's chief architect, the man responsible for the experiment. He cites random surveys showing that desks and file drawers are frequently used to hold personal items such as lunch bags and shoes rather than working papers. Therefore functional furniture with fewer storage areas was provided to keep the collection of personal items at a minimum.

One of the appealing features of the décor is the inclusion of 60 plants in







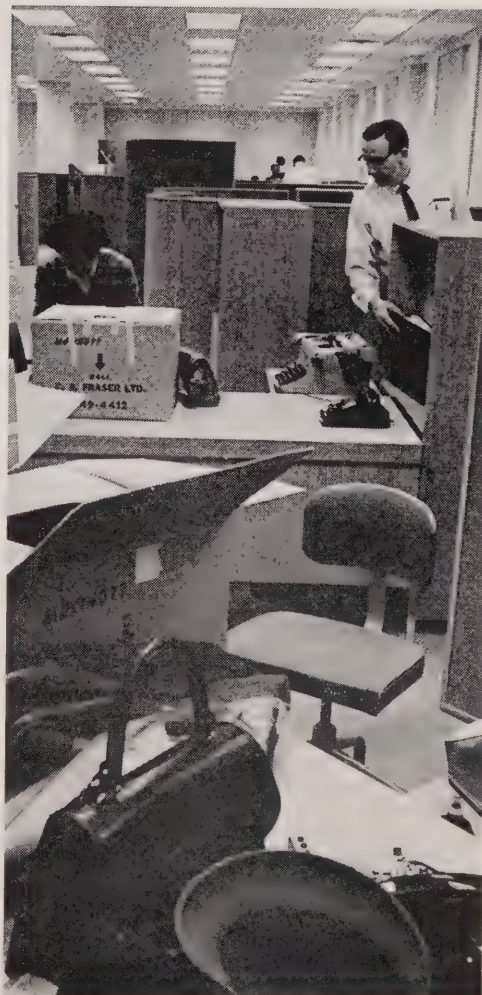
*Tidy desks amid the foliage contrast sharply with the clutter of moving day (below) in office landscaping experiment in Ontario Hydro's engineering building.*

attractive white fibreglass containers. The plants, watered and nurtured by a private contractor, absorb sound and give the office a sense of privacy to employees.

Color coding is also evident. The manager's higher screens than the rest of the group and, in this case, the fabric of the screen is rust. A similar arrangement is used in a central conference area. Dashes of color are also provided by the red and blue "in" and "out" baskets. Tiny unobtrusive overhanging signs identifying each desk are the only graphics in the office area.

Is office landscaping democratic? It is. And the whole scene seems to reveal in it. But the pleasant office scene is deceptive. The concept of office landscaping requires many hours of time-study into communications, efficiency and the realization that the computer is rendering obsolete many of today's routine jobs.

We must realize that most of our employees' workload can be segregated into two distinct operations — paper processing and decision making," Mr. Candy explains. "For this we must have the strongest communication links and a pleasant, pleasant atmosphere. We also must realize that as automation takes over we are faced with an office staff of middle management and executive types who require flexibility and an environment



conducive to teamwork rather than the assembly-line approach."

According to Mr. Candy, the prime objective of office landscaping, which was developed in Germany in 1959 by a company named Quickborner, is improved work performance through better communications. And communications will be vitally important in the new Hydro building, a 16-storey structure embracing 620,000 square feet of office space — 50,000 square feet on the first floor diminishing to 15,000 at the top.

One of the major advantages of office landscaping is cost. Entire departments can be relocated overnight for about 50 cents a square foot compared to \$7 for a conventional layout.

Other companies which have recently adopted office landscaping include Consumers Gas and the Royal Trust, both in Toronto. But perhaps the best example is the 29,000 square-foot installation at the Eastman Kodak Company in Rochester, New York. Ten weeks after office landscaping was complete, a survey showed that 88 per cent of those working in the new surroundings preferred it to the conventional arrangement. The 12 per cent who liked the old way better were — you guessed it — the ones who lost their status symbols. □



A writhing silver-colored torpedo erupted skyward about 40 feet from the canoe. Through a hail of flying water I could see the small golden lure hanging from its jaw. The fish had been fighting on a two-pound test line for five minutes and it would be that long again before it could be landed.

There was no doubt as to its identity. Jack Lake, in Ontario's Algonquin Park, holds no other fish that size. This was 18 inches of sheer fury named the wendigo — a fish that man made.

The wendigo, sometimes called the splake, is a hybrid created from crossing the lake trout and the brook or speckled trout. But the wendigo is more than just a fish. It is a piece of applied biology that is not only faster growing but also better adapted to the changes that have taken place in the Great Lakes than either of its two ancestors.

Like the brook trout it is always mature

in three years and frequently in two. Like the lake trout it has a swim bladder — an air sac that enables it to live in deep water. Like both its ancestors, the wendigo spawns in the fall.

It seems like a great deal of work and expense just to provide new thrills for trout fishermen, but this was not the reason for the wendigo. The fact that it is a fine game fish is just a fortunate bonus.

The wendigo was developed with the hope of revitalizing the depressed commercial fishing industry of the Great Lakes. At one time, the upper Great Lakes abounded with schools of sleek, silvery lake trout which supported a prosperous fishing industry in hundred's of lakeshore communities. Then calamity struck. In the late 1930s and early 1940s the sea lamprey, an eel-like, blood-sucking predator, made its way through the Welland Canal into Lake Erie and up into the other Great Lakes. So devastating were the

results that within a few years the lake trout was exterminated.

To combat the lamprey, a highly selective poison known as lampricide was developed. Hopes ran high for its success. Lampricide is sprayed into rivers where it kills only larval lamprey leaving fish and other aquatic creatures unharmed. A control program began, first in all the streams flowing into Lake Superior, then in the other upper Great Lakes.

When the lamprey declined in Lake Superior, the waters were restocked with lake trout. But the lamprey population may still be large enough to cause problems for the slowly maturing lake trout and it will be another two years before the results are fully known. It may be the only way the lake trout population can be kept high is by artificially hatch fish. It is questionable, however, whether any significant commercial fishery could be maintained by such an expensive method.

# the fish that man ma





he lake trout is especially vulnerable to the lamprey because it reaches sexual maturity very slowly. It takes seven years before it spawns and produces the first generation — a long time to live in lamprey-infested waters. A faster-maturing fish that could live in the deep water habitat of the lake trout was needed.

r. Fred Fry, one of Canada's leading fishery scientists, was the first to see the wendigo's potential in filling this role. The wendigo spawns within three years and thus stands a better chance of producing a generation before it falls victim to the lamprey.

Fry, of the University of Toronto, found a willing ear in Ken Loftus, fisheries research supervisor for the Ontario Department of Lands and Forests. They were joined by Jim Tait, who had undertaken a study of the deep swimming ability of the wendigo for his Ph.D. thesis under r. Fry. Heading the team to develop the

wendigo into what it is today was A. H. Berst, a former professor at the University of Guelph.

The wendigo is not really new. It was first produced in New York in the late 1870s, but the ichthyologists of the day considered it just a zoological oddity. Every decade or two since then a flicker of interest has flashed through the fisheries world, but no serious research was done until Ontario fishery scientists recognized its potential and began their studies and development in the late 1950s.

The wendigo has come a long way since then. In many respects it is an improvement on nature, much like the high yielding fruits, grains, and vegetables and fast growing livestock and poultry developed by hybridization and selection. It is now a highly selected and developed fish capable of living in deep water where there is an abundance of forage fishes such as chubs, bloats and ciscoes.

The Ontario Department of Lands and Forests has big plans for it. After experiments in several northern lakes, including Jack Lake, 30,000 wendigo were stocked last year at Meaford and South Bay on Lake Huron. But this is just the beginning. This year's plans call for the stocking of 400,000 more and, after that, half a million annually.

The stocking is intensive. Fishery scientists believe that broadcasting the fish over large areas would be unwise. The idea is to establish local viable populations that will spread out on their own. Stocking sites have been carefully chosen to include the old spawning beds of the lake trout. Every one of the old lake trout spawning grounds in Lake Huron will be stocked for three consecutive years, the sexual cycle of the wendigo.

If the program succeeds, what then? Well, Lake Superior may get the same treatment as Lake Huron. In addition, Ontario has replenished the wendigo brood stocks of the Michigan Department of Natural Resources so that this agency can begin a similar stocking program in Lake Huron.

And the chances of success? Fishery scientists of the Great Lakes Fishery Commission, the United States Bureau of Sport Fisheries and Wildlife, and the State of Michigan all share the guarded optimism of their Ontario colleagues. It simply boils down to this: is the wendigo's three-year spawning cycle short enough to face the lamprey predation? The only way to find out is to stock the wendigo then wait and see. □

*Fishery officers stock Ontario waters with yearling wendigo.*

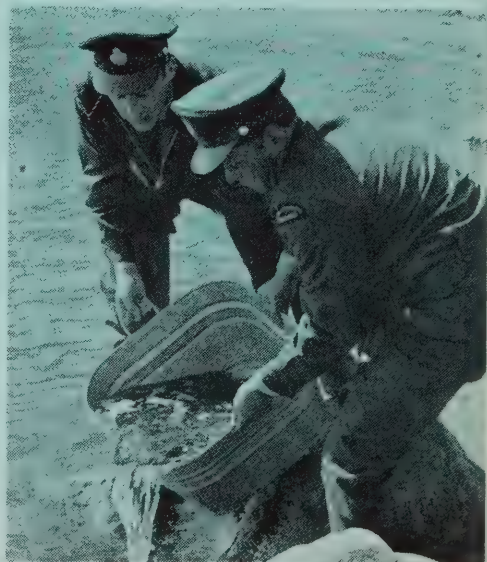


photo courtesy Ontario Dept. of Lands & Forests



# bagging the cat







Cats and power poles have a curious affinity for each other. Occasionally, a fearless feline will tackle one for no other reason than men will climb a mountain — because it's there. But, pragmatic creatures that they are, the more usual purpose is to avoid canine pursuit.

It's then an open question whether pussy will merely debit one of his lives or blow all nine in a shower of sparks. Not only that, some mere human may feel inclined to risk the one life with which he was endowed in an heroic rescue attempt.

The risks are high and even the local utility is at times reluctant to send in experienced line crews. Apart from the obvious hazards of height and high-voltage, the whole business is complicated by the tendency of the friendly neighborhood cat to become a veritable tiger once you have him by the tail.

About a year ago, engineers in Ontario Hydro's line maintenance department put their heads together with Kearney National (Canada) Ltd. to see if they couldn't devise a way of saving the cat from catastrophe. Their solution is a five-foot insulated pole equipped at the business end with a broad and comfortable noose. Slip it over the animal's head, give a quick tug and pussy's well and truly in the bag.

"We've had demonstration rescues with the Humane Society on hand and the last one was very successful," says development technician Wayne Dobson. "Mind you, we had an extremely co-operative stray. We had him by the scruff of the neck for about 25 seconds and it didn't seem to worry him one bit." □



*Perfected cat-snatcher, essentially a five-foot insulated pole with a noose at the business end, is designed to cope with situations like those at left.*



About 1,500 delegates from municipal systems across the province lay ground rules for the future of electrical distribution in urban Ontario

# blueprint for the seventies

Ground rules for regional government studies of electrical distribution systems were hammered out by delegates at two action-packed sessions of the annual meeting in Toronto of the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities.

With only two minor amendments, several attempts to alter its content and after a careful examination of the finer points, delegates almost unanimously endorsed a nine-page policy statement.

Highlights of the statement include a strong appeal for the continuance of elected municipal Hydro commissions and the formation of special study committees in each area where a regional government is proposed.

Ushered through the sessions by govern-

ment legislation committee chairman John P. MacBeth, of Etobicoke, the statement says: "It would be quite consistent with the province's regional government program for municipal electrical utility systems to be established either with one system at the upper tier to serve the entire region, or designated parts of it made up of adjacent integral municipal units, or with several at the lower tier, each new area municipality within the region establishing its own separate municipal system.

"Alternatively, Ontario Hydro's rural retail system could assume responsibility for retail distribution either for the whole region, or for a part of it.

"Which of these alternatives is most appropriate for any particular proposed municipal government region should be

determined from the results of cost studies. Such studies would give due consideration to existing and future economic conditions, and would be ordered by a special committee properly representing of electrical utility interests and customer groups within the proposed region.

"Such representation should include a commissioner from each of the existing municipal electrical utilities in the proposed region, and representatives of rural customers, who would be named by Ontario Hydro."

And the point all delegates were pressing for – that the committee chairman named by the OMEA – was included in the policy proposal. It said the chairman should be an individual with broad experience in the electrical utility field and with no



onal interest in the particular region under study.

The clause was later amended to permit the chairman to be from within or outside of the particular region under study but with no conflict of interest.

Costs of each study, the report suggested, could become part of the re-establishment costs associated with the formation of the new retail electrical entities and, on completion, it would be the duty of the chairman to forward a recommendation to the Minister of Municipal Affairs for consideration and legislation.

In reply to a question by George Burley, chairman of the Niagara regional study group, Mr. MacBeth said his committee is opposing new study groups, but assured that the work of previous study groups would not be lost but would go to new committees appointed by the minister.

An amendment proposed by Thunder Bay's Mayor Saul Laskin that grants-in-aid be taken into consideration and negotiated where applicable received overwhelming approval as delegates examined the section entitled transfer of assets.

"We're in the process of purchasing the assets from Ontario Hydro in two largely rural townships," said Thunder Bay delegate Lou Danis, "and we were given extremely courteous hearings by Hydro — they certainly are open to negotiation, even if you don't agree with the figures they set for a full service take-over. I want every delegate to know Ontario Hydro's been very fair with us."

The policy proposal called for the transfer of assets to be based on outstanding debt when only a part of the distribution system involved. It stated this principle should be consistent throughout the province.

An attempt by North York delegate John Gunn to accept the policy proposal "in principle" and return it to the government legislation committee to incorporate designated amendments into a new statement before forwarding it to the minister was soundly defeated.

A second attempt to change the statement — word by word — was also trounced. Puffing on a king-sized cigar after guiding the proposal through the convention, Mr. MacBeth said the key is the maintenance of the power-at-cost concept through retention of independent elected electrical commissions.

He said that if the distribution of electricity were handed over to a committee of Council Hydro revenue might be used for other municipal purposes. The best way to ward against this was through separate, distinct and elected commissions.

And, he added, the committee could definitely see many advantages to regional government. □



George Gathercole

## Plea to unions for restraint

Ontario Hydro Chairman George Gathercole called upon unions to practise restraint in demands for increased wages to help get the economy moving again.

Speaking to a joint OMEA-AMEU session, Mr. Gathercole said he "is not attributing the escalation of prices solely to the higher demands of unions or labor, but my attention is directed to labor because business and professionals have undertaken not to charge more than sufficient to recover the increase in their costs and governments have agreed to co-operate."

"Unions have played a valuable role in the economy and will continue to do so, no doubt on an increasing scale. Workers are entitled to share in the benefits and higher standards of living that accrue from our productivity," Mr. Gathercole said.

He hastened to add that he was not advocating a cheap pay policy. "I support the highest wages and salaries that the economy can afford, consistent with maintaining a reasonable price stability and a viable, competitive international trading position," Mr. Gathercole said.

He pointed out that he recognized the difficulties union leaders have in convincing some of their memberships that moderation is in their own best interest. He cited it as a problem of organization, "and perhaps, above all, of education."

"What real benefit is achieved if much of the increase in wages is absorbed by the rise in living costs and it produces a spate of measures that inhibits production and creates more unemployment and general unrest?"

"What benefit is realized if these gains are won at the expense of pensioners who have already made their contribution to Canada's development and are now watching and suffering from the fact that the income on which they had counted to look after their retirement gradually shrinks? Where is the justice to them?" Mr. Gathercole asked.

He said it would not make sense to advocate a freeze on wages or prices. Some wages have lagged. Considerations of equity dictate that these matters be put right and a price freeze would be equally unjust and also unworkable, he said.

"What the newly appointed Prices and Incomes Commission asks for is the application of good sense and reasonableness," Mr. Gathercole added.

Suggesting the nation is in the midst of an economic downturn, Mr. Gathercole said there are many signs to show it. He called for an injection of credit to get the economy moving vigorously ahead again to restore confidence.

"But until there is effective co-operation of all major segments in our economy in a joint program of reasoned restraint, it appears that those who are charged with the responsibility of directing our fiscal and monetary policy dare not relax restrictions or accelerate the pace of activity on pain of having to curb inflation again, but by measures that would be more restrictive, stringent and austere," Mr. Gathercole cautioned.

What do all these anti-inflationary measures mean to Ontario Hydro? They mean that more attention will be focussed on rates and Hydro's operations. They mean that Hydro will have to be more productivity-conscious and more cost-conscious.

"The challenging job ahead of us will be to carry on a program of conventional and nuclear thermal development with all its complexities, and to do so at the lowest cost that can be accomplished consistent with security of power supply."

"If we are to do that we must be adaptable to changing conditions. That also applies to the municipal commissions, for none of us can afford to maintain an operation or function that is not justified. True, we always have to take into consideration the side effects of any reorganization to ensure they will not be overly severe. But if we ignore the opportunities for securing economies because difficulties stand in the way, we will not make the progress that our customers expect from us," Mr. Gathercole told delegates.

But he ended on a happier note for most of the utilities represented in his audience. He said 260 utilities will receive credits in their 13th bill amounting to \$1.5 million. For the remaining 95 utilities, he said, there will be relatively small debits. □



## 'Militant' phrase raises hackles

OMEA delegates struck a paragraph which blamed militant unions for being "a major factor in inflationary pressures" from a resolution dealing with labor-management relations. Two other paragraphs were also deleted.

Delegates, however, passed the amended resolution calling on the provincial government to enact legislation recommended in the Rand Commission report to classify utilities as essential services.

The District 6 proposal turned out to be the most controversial in the initial two-hour resolutions session. It was recommended for approval by the resolutions committee.

George Brooks, of Whitby, objected that the resolution made no reference to various associations and pressure groups adding to inflationary pressures.

"It's all of us," he said. "Why pick just one segment for censure?"

Mayor M. Solski, of Coniston, criticized the Rand recommendations as being "of the 18th century and not relevant to modern labor legislation." He said the government is considering new labor legislation and the OMEA's aim should be to promote "peace and harmony."

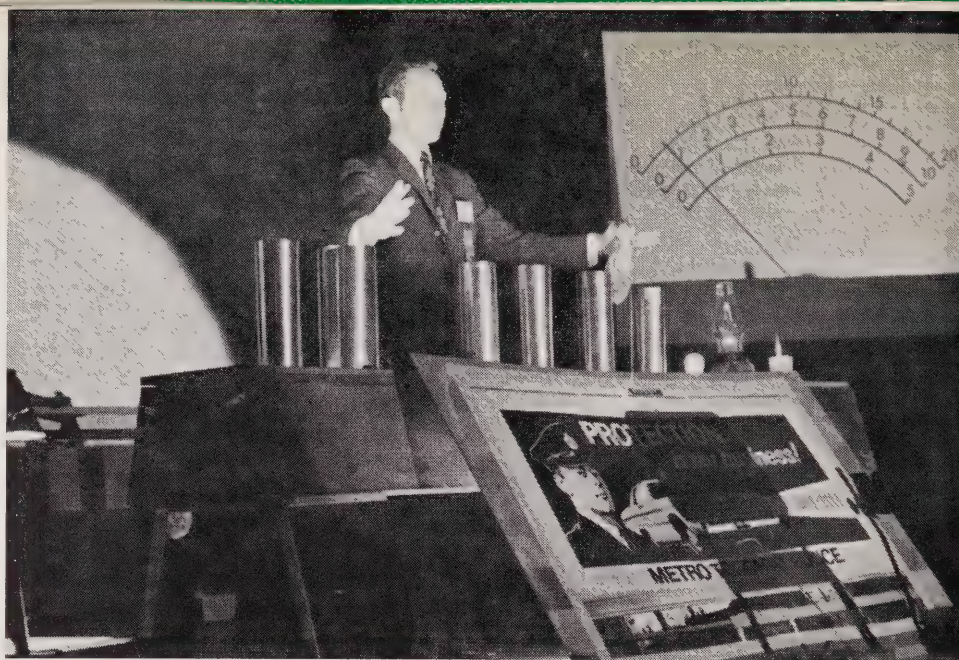
Mayor Solski said Hydro workers are a "fair group of employees" and should not be singled out for criticism. He said he didn't think the resolution would help to resolve any labor-management problems in Ontario or any of Hydro's problems.

Eric Durance, of Windsor, said his utility "unanimously opposed" the resolution and he challenged the resolutions committee to defend it. E. B. McPherson, of Port Colborne, and Ron Elliott, of Deep River, who said he was not "anti-labor," supported the resolution.

Hugh McDonald, of Nepean Township Hydro, suggested deletion of three paragraphs to make it "a reasonably unbiased resolution." He was supported by C. J. Murphy, of Sault Ste. Marie, who said he feels commissioners are concerned that essential services should be maintained.

The amendment deleting paragraphs, which were criticized by one delegate for their "intemperate language," and the amended resolution carried with a heavy show of hands.

The amended resolution expresses "concern and dismay" that legislation has not yet been revised as a result of the Rand Commission report and urges Labor Minister Dalton Baile to take action "without further delay." □



*Different types of lighting are demonstrated on stage in session devoted to the relationship between streetlighting and the incidence of crime.*

## AMEU's new leader will cover 25,000 miles

When John Murphy took over the reins of the Association of Municipal Electrical Utilities this year he embarked on a trip equivalent in length to a voyage around the world.

Meetings of the AMEU, an engineering workshop in Arizona, conferences, seminars and umpteen engagements will demand his attention as president of an association representing senior management of more than 350 municipal electrical utilities in Ontario.

There'll be little time for relaxation beside a log fire or the waterfront at his comfortable cottage home at Big Bay Point on Lake Simcoe. And the swivel chair behind the manager's desk at Barrie PUC is likely to be unoccupied more often than usual. Not that the new president — a firm believer in delegation — is in the least concerned that conditions will deteriorate in his absence.

"It's pointless sitting here and keeping such a tight control on things that no one else knows what's going on," he says. Nevertheless, the technical books lining his office shelves and the piped-in voices of the outside work crews as they converse over the radio testify to the way he keeps abreast of the daily affairs of this \$4 million-plus operation.

John Murphy was born in a small community ironically named Golden Valley, about 30 miles southwest of North Bay. Irony because his memories of that place are not so golden.

"My father ran a small lumbering operation there and had a beautiful team of horses," he says. "One day they broke a crippling dad so badly he had to sell the business and move. This was at the height of the depression. I never went back."

The family bought a boarding house nearby South River, a booming community in those dreary, soul-destroying days to the thriving business of distilling whisky from timber taken from Algonquin Park.

"Most of the woodcutters were from the north," Mr. Murphy recalls. "They were a good class of people. This was long before the days of chain saws yet they could fell a tree almost as quickly as it now takes a man with modern equipment."

"If you visited their work camp they'd fill you full of coffee and cake and if you were on really friendly terms, invite you into the steam bath. That's the first thing they'd build when they set up camp. First, it might just be a dugout in a bar of earth, but later they'd make a permanent one of wood."

"In winter, they'd travel for miles on sleds they made from white birch, soaked in pitch to waterproof them and waxed with ordinary candle. They wore boots with turned-up toes to hook into the toes of others and propelled themselves along with long foot poles. What with their long pole arms like pistons, they had a tremendous sweep that practically lifted them off the ground."





J. Murphy

Mr. Murphy went to school in South Bay, later progressing to North Bay Collegiate and the University of Toronto, where he studied engineering. "We took first-year drafting in what was known as the old red schoolhouse," he says. "Pigeons used to roost in the rafters and we were in continual danger of being spattered."

Immediately after graduation, Mr. Murphy obtained a \$25-a-week job as an engineer with the Barrie utility. "I'd never heard of a PUC before, but jobs were scarce," he says. However, the year was 1940 and he'd been there only a few months when he went to the army.

He moved from Newmarket to Camp Gordon and from there to officers' training school at Brockville — "That was rough. There wasn't a course but two or three people would get killed." On to Windsor to learn about the guns and tanks turned out by the automobile plants. "People laughed when we walked down the street in uniform, yet in Detroit they couldn't do enough for us."

Overseas in the summer of 1942 . . . more training . . . joined the Second Canadian Armored Brigade . . . the D-Day landings in Normandy . . . fond memories of Nijmegen in Holland. "They had a beautiful three-phase distribution system that was second none."

Captain John Murphy returned to civilian life in the Barrie PUC where he rose steadily through the ranks to become manager in 1952. He now heads a staff of 50 responsible for the supply of both electricity and gas in this city of 25,000. Peak load is at 40,200 kilowatts, a far cry from 2,300 kilowatts when he joined the utility as a fledgling engineer.

John Murphy's straight-talking, no-nonsense approach has served him well in the AMEU. After working as secretary-treasurer of the Georgian Bay Municipal Electric Association for a number of years, he was first approached about five years ago to sit on an AMEU marketing committee. The next year he was made director at large. Last year he became vice-president.

Mr. Murphy is continuing as secretary-treasurer for the elected utility officials and also as chairman of the Advisory Vocational Committee of Simcoe County Board of Education. Between these duties and his 25,000-mile odyssey, he may find some time to spend with his wife, Helen, and their three sons, two of whom are now at the University of Toronto.

He just may. □

## OMEA chief has few illusions about his task

Douglas Gordon Hugill, of Sault Ste. Marie, steps into the presidency of the OMEA with some decided views on the issues facing Hydro municipalities in 1970.

Mr. Hugill, who is the second OMEA representative from Northern Ontario elected president in the association's history, talked about regional government, inflation and the municipal environment in an interview shortly after his election.

On regional government: "We face a lot of problems in the political area in view of the regional government concept. Our job is to remind governments at all levels that the municipalities are partners in the Hydro enterprise and that we want to be heard."

"We must see that regional government changes don't result in inequities to customers. We support the sale of power to customers at cost."

On inflation: "We are going to have to do our bit to combat inflationary pressures. We must take a hard look at capital expenditures but we must be sure we do not put ourselves behind the eight ball when we have to supply extra load."

On the environment: Mr. Hugill said the major environmental problem faced by municipal utilities is "resistance to new overhead line construction."

He said installation of lines underground in new subdivisions was less costly than conversion programs in built-up areas where overhead cables had to be replaced. Many utilities across the province have been installing underground cables in new subdivisions or in the core areas of municipalities, he said.

"It's got to be taken piece by piece," he added, advocating a gradual program of placing power lines underground because



D. G. Hugill

of the high costs involved.

Mr. Hugill said he expected Ontario Hydro may face pollution and siting problems which may result in higher power costs.

Mr. Hugill, who was 1st vice-president of the OMEA in 1969 and chairman of the resolutions committee, has been a member of Sault Ste. Marie PUC for 13 years. He served on the first elected commission in 1957 and subsequently served three years as chairman.

In 1966, he was elected 1st vice-president of District 9, OMEA, and then held office as district president and 2nd vice-president, which involved three years on the OMEA board of directors.

Mr. Hugill was born in Sault Ste. Marie and attended school there. He is an accountant with Algoma Steel, the city's major industry.

A son, Ian, is attending Osgoode Hall in Toronto to obtain his law degree, and a daughter, Anne, is an occupational therapist in New England.

Mr. Hugill takes pride in his Scottish ancestry (on his mother's side) and in Sault Ste. Marie, which he says is "one of the best lighted cities in Ontario." The Sault utility has installed mercury vapor lamps in all its residential areas over a period of years, much to its customers' approval.

E. C. (Ted) Dash, of Sudbury, was the first Northern Ontario delegate elected to the post of provincial president several years ago. □





*Delegates examine one of the many displays on the convention floor.*

## **\$130 'fine' for oil switch censured**

An "emergency resolution" criticizing the Ontario Housing Corporation for charging a \$130 penalty to homeowners who wish to use fuels other than oil in a Nepean Township subdivision was endorsed by OMEA delegates.

The resolution, moved by F. R. Cross, of Nepean, and seconded by A. J. Bowker, of Gloucester Township Hydro, stated that homeowners in the Borden Farm subdivision must take oil from a pipeline owned by Public Fuel Transmission Systems Limited or pay the \$130 penalty. A \$65 charge is levied for each multiple dwelling unit involved in a switch from oil.

Mr. Cross, who read an OHC document attached to HOME lot purchase agreements, said Nepean believes the agreement is unfair. "We won't be able to sell any all-electric homes in the subdivision."

He said the three-phase housing development will involve ultimately 900 homes. The first phase involves about 250 homes, and about 50 lots remain to be sold.

The resolution said that the OHC restrictions on alternative fuels are expected to apply to other HOME (Home Ownership Made Easy) subdivisions in the Ottawa-Carleton region.

Dr. R. H. Hay, of Kingston, charged that the situation was "completely iniquitous." It should be brought to the attention of OHC, he said, that "the people will not

tolerate a monopoly by a private corporation."

E. R. Alexander, of Barrie, said he understands that developers pay \$200 a lot to Hydro when underground power lines are installed in subdivisions and he urged caution. "We are opening the door to a lot of rocks," he said.

The resolution asks the Ontario government to rescind the Nepean policy and to inform all homeowners who have leased or purchased lots that "the penalties . . . will not be enforced and they are free to heat their homes with the fuel of their choice."

Delegates carried by a large majority another resolution which calls on Ontario Hydro "to study and amend and expand where appropriate the existing financing program to make interim and secondary financing available in all-electric subdivisions."

Commenting on the resolution, Mr. Cross said: "We have to compete with other forms of energy." He said Nepean had seen a drop in the number of new all-electric homes because builders could not get necessary financing.

Delegates deleted wording which would have restricted such financing to "rapidly expanding urban areas." □



# along hydro lines

## How much a kilowatt?

Perhaps there's a lesson to be learned from the students. Electronics specialists at M. M. Robinson High School in Burlington have built a working model of the Sir Adam Beck-Niagara generating station No. 2. Instructor Ron J. Daquanto, far left, oversees the operation of the 4 ft by 8 ft model, which cost \$35 to build. The real thing cost Ontario Hydro \$317 million — way back in 1958.



Student power

## the big league

Energy, Mines and Resources Minister J. J. Greene says Canada, for more than a quarter-century, pursued a program of nuclear research and development that has kept this country at alongside the world leaders — Britain, France, Russia and the US — in nuclear knowhow.

Speaking last month to the Niagara Peninsula branch of the Engineering Institute of Canada, Mr. Greene said although Canada has spent much less on its nuclear program than other nations, the quality of work done by Canadian scientists and their contributions to nuclear progress have qualified the country for big league status.

But, he said, "just when we are getting close to seeing substantial returns from the nuclear effort in Canada, and just when we are developing prospects for doing some substantial business abroad, there commences within Canada what looks almost like a campaign to cut the nuclear program down to size — like down to nothing."

His immediate retort is that if enough gloom dispensers keep talking down the program and enough people start believing them, it surely will run into trouble.

Mr. Greene said the Canadian natural uranium, heavy water reactor system is extremely efficient. "With careful and proper selection of other materials in the reactor core, such as the low neutron-absorbing material zirconium, it is possible to burn natural uranium as the fuel and to burn it so efficiently that about

twice as much energy can be extracted from a ton of uranium ore as is possible from any other current reactor system.

"That we have a very good system, there is no doubt," Mr. Greene added. "But the nuclear power program, the introduction and application of the system, has had its problems and is bound to have more. The most publicized of these have occurred at the prototype Douglas Point station. The general impression was that after a short spell of teething trouble the station would settle down to smooth, steady operation. Three years after first power it still has not reached maturity."

"Over this there has been much wringing of hands and pointing of fingers, as if it were a major disaster. Yet I venture to say that if Douglas Point were a conventional thermal plant and had comparable trouble, there would have been very little fuss — and I'm told it takes as much as four or five years for a conventional plant to reach maturity."

Mr. Greene said that recent surveys have revealed that Douglas Point is no worse and no better than prototype plants in other countries. □

## Talkative family

Both brother and sister figured among the province's top young speakers in last month's finals of the Ontario public speaking contest in Toronto.

Mary Balka, 14, and her 11-year-old brother, Edward, made the trip from Kenora a worthwhile venture. Mary won the secondary school prepared speech category; Edward came second in the elementary school class. Their sister, Halina, made the finals last year but was unplaced.

Kathy Murtha, 13, of Lindsay, won the elementary contest with her remarks on "Starvation." In third place was Wendy Bradley, also 13, of Navan, near Ottawa.

Mary Balka's subject was "Women's Rights — The Rib's Revenge." In second place was Lloyd Miller, 15, of Weston, who emigrated from Jamaica about two years ago. Janice Johnston, 17, of Campbellford, was third.

Eighteen-year-old Paul Kennedy, of St. Catharines, topped the secondary school impromptu speakers with his discourse on "The Role of the United Nations." Elizabeth Macnab, 15, of Minden, came a close second and 15-year-old Maxime Souliere of Sault Ste. Marie, was third.

The contest is co-sponsored annually by the Ontario Public School Trustees' Association and Ontario Hydro. Ontario Hydro Second Vice-Chairman Ian F. McRae presented prizes.



Sisters... phooey!



## Bonnie's ad's a beauty

Bonnie Stewart won top spot in her school's marketing class project with an advertisement for Sault Ste. Marie PUC.

Dave Cohen, advertising director of the Sault Star, who did the judging, said Bonnie's ad was "quite professional." The ad had an illustration of the Cascade water heater and informed readers that it could be purchased outright or rented.

For her efforts Bonnie, a student at Sir James Dunn Collegiate, was presented with an engraved silver tray by Cliff Sharp, centre, the Star's display advertising manager. With them is George Baxter, the PUC's marketing supervisor.



*Top of the class*

## A fast buck

Tecumseh's mayor Hector Lacasse took a little time out from the OMEA-AMEU convention last month to go on a gift-buying spree in downtown Toronto for his wife and 10 children. And he picked up a "fast three grand" while he was at it.

Mr. Lacasse found a bag on Adelaide Street on his way back to the Royal York Hotel, but delayed opening it because his arms were full of packages.

Back at the hotel he was "quite shaken up" when he looked inside and saw a small fortune in cash and cheques. "I got to counting and my first thought was there was at least \$100 to \$150 per kid in that bag," he said later.

"Then, when I hit those four brown ones (four \$100 bills) I really jumped. When I got to \$1,200 — I just quit counting."

The bag contained \$3,248, about \$2,000 of it in cash. Book-keeper Sylvia Kane had dropped it on the way to bank the money on behalf of a Yonge Street shoe store.

Mr. Lacasse didn't let his honesty in returning the money go to his head. Just the reverse, in fact. Both he and his wife are sporting a new pair of shiny expensive shoes — gifts from the grateful owners of the store. □

## Safety first

Trenton PUC, Mississauga Hydro and St. Thomas PUC were a pretty safety-conscious trio last year as they've proved by winning Electrical Utilities Safety Association awards for having the lowest accident frequency in the electrical distribution field in Ontario.

Trenton received its award in the under 60,000 man-hours category for working 55,871 hours without a compensable injury. St. Thomas PUC won the 60,000 to 250,000 man-hours

class for working a total of 80,101 hours without an accident. Mississauga's prize was in recognition of 403,611 accident-free man-hours.

## New Ottawa commissioner

A. E. Lon Campbell has been appointed a commissioner of Ottawa Hydro to succeed J. E. Stanley Lewis.

Mr. Lewis, who celebrated his 82nd birthday last month, has been in public life for over three decades — the last 18 years as chairman of Ottawa Hydro. Born in the nation's capital, he was mayor from 1936 to 1948 — a record for the office. For his services to the city, Mr. Lewis was awarded an honorary doctor of laws degree by the University of Ottawa in 1941.

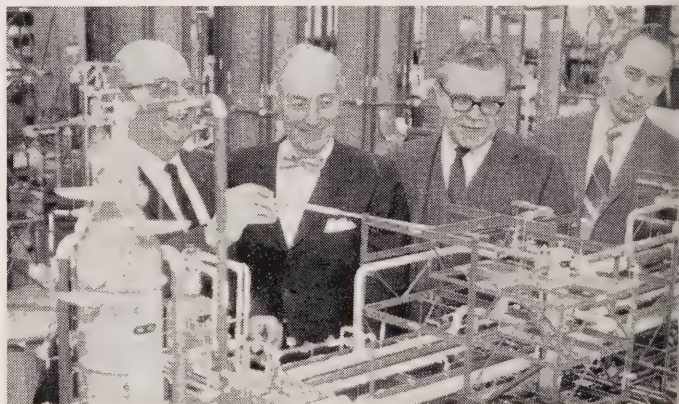
Mr. Campbell was an alderman in Ottawa from 1951 to 1955 and has been a board member of the Central Canada Exhibition since 1955 and is currently its 1st vice-president. He is a partner in an insurance firm of Ault, Kinney, Campbell and Gallinchan and is active in local clubs and associations.

## Not so confusing

Although you'd never tell it by the photograph, this seemingly confused mass of tubing and scaffolding is really simplicity itself. It's a three-dimensional model of a section of the Bruce nuclear power plant which is being built by the Lumus Company.

The complete model will be used by Lumus personnel during the construction period and will remain on site afterward as a training aid and to simplify maintenance problems.

Examining the model at the Lumus offices in New Jersey are Atomic Energy of Canada Limited's heavy water plant manager Peter Spray, second from left, and Lumus Company worker



*Sorting it out*

## Guardian angel

The Canadian Standards Association, for 51 years the guardian angel of the nation's consumers, will be silent no longer.

With the introduction of a federal government bill to set up a Standards Council of Canada, the CSA has adopted a nine-point program to strengthen and expand its own role.

The association — its hallmark is a stylized symbol composed of the letters CSA — operates on an annual budget of \$5 million and is voluntarily staffed and financed by industry.

It establishes safety standards and performance codes for a vast number of products built in or imported into Canada. One of the standards, to cite one of many thousands of examples, that the CSA has adopted to ensure the safety of Canadian color TV sets is that some US sets were plagued with X-ray emissions and other hazards.

Gordon Tebo, CSA's managing director, says the new program is aimed at bringing benefits to both Canadian consumers and

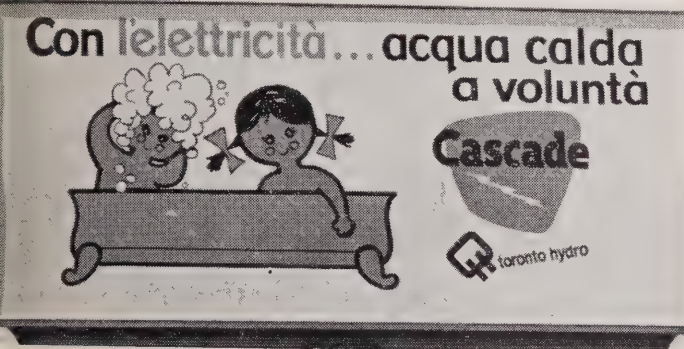


ers. It will include improved communications with association members and clients, the establishment of a consumer council and technical aid to Canadian exporters.

"We see great expansion ahead for CSA in preparing to serve any new fields such as building products and systems, textile, health and sanitation, auto safety, pollution, electronics and household products," Mr. Tebo said. □

## New bilingualism

With close to 300,000 Italian-speaking Canadians around Metro Toronto, George Exley, manager of Toronto Hydro's appliance department, figured it was time they got the Cascade message. The result was this billboard in the heart of the first generation Italian community in the College-Grace streets area. The message, plenty of hot water—electrically, can be seen for miles along College Street.



en in Rome ...

## Doing shopping?

atford's where it's at.

Everything for the utility man's tool crib—from a line connector can pick up for a dollar to a \$55,000 aerial bucket derrick—will be on display at the fairgrounds May 20–21 during Association of Municipal Electrical Utilities equipment display. And close to 1,500 delegates from all over Canada and the US are expected to mill about the exhibits containing well over \$1 billion worth of equipment.

Among the highlights will be demonstrations in the latest techniques of municipal utility distribution systems, construction methods in both overhead and underground distribution and line rubber glove work. After sunset, a streetlighting demonstration will be held. □

## Deep freeze motor

British have unveiled a technological development that could revolutionize the heavy electrical industry. It's the world's first large-scale super-conducting electric motor and it was displayed at the Newcastle-upon-Tyne headquarters of International Research Development.

The motor is no laboratory novelty. It produces 3,250 horsepower and will be installed in the Fawley power station, Hampshire, where it will be used to drive a water pump.

The most striking aspect of the "deep freeze" motor is its small size, although it requires a great deal of auxiliary equipment and runs on an extremely high-amperage, low-voltage current.

The secret of the dramatic scaling down is the use of superconducting coils of a niobium-titanium alloy that are cooled to minus 270 degrees Centigrade by a liquid helium refrigerant. At this extremely low temperature, the coils offer virtually no resistance to an electric current. Their increased efficiency thus allows a drastic reduction in size. □

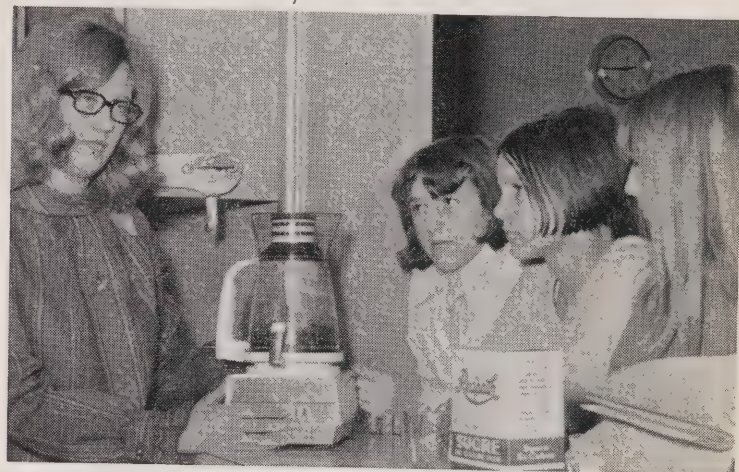
## Sarnia teach-in

Miss Dorothy Hamilton's Grade 8 class from Sarnia's Confederation Public School recently went to learn about the workings of an electrical utility—and had some goodies while they were there.

While the boys went to see how to calibrate a meter the girls went to the kitchen with Sarnia Hydro's home economist Susan Reyecraft, left, who showed them the intricacies of preparing a chocolate mousse for their beaux. Watching Miss Reyecraft are Joy Dunford, Mary Hache and Brenda Bayly.

But before refreshments were served the class heard from assistant manager Bob Reynolds on the distribution of power and toured the building, highlight of which was a pole-top rescue and resuscitation demonstration.

Four or five groups from various area schools tour Sarnia Hydro's facilities annually.

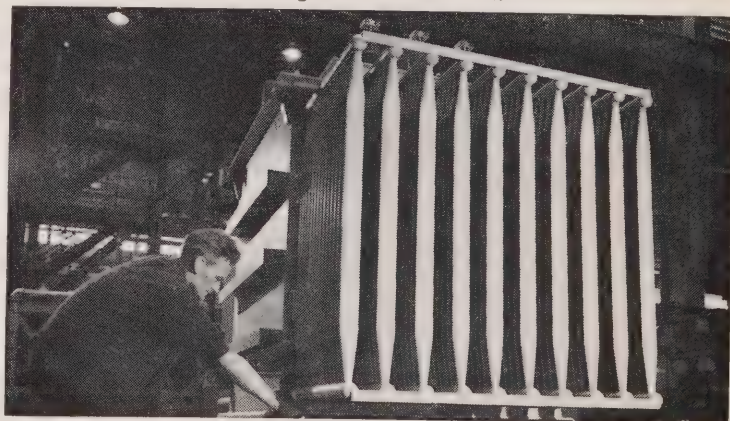


There's a mousse in the house

## Air-lift

A 12-ton transformer built by Canadian Westinghouse glides effortlessly one-thousandth of an inch above the floor on a cushion of compressed air. A portable air-lift pad fits into the specially designed base of the transformer, converting it into a miniature hovercraft and eliminating the need for an overhead crane during installation.

Westinghouse experts say the system can be used to move any transformer, regardless of size and weight, over a concrete floor. The company is building 15 such transformers for a substation at Dofasco's new slabbing mill in Hamilton.



Muscleman's pad

## Space lights may save earth lives

Metropolitan Toronto police are hoping a \$1,250 telescopic arm developed for US space vehicles will save lives on the city's busy traffic arteries.



A rotating red beacon and four floodlights have been fitted on the arm, mounted in a 13-inch-high container on the roof of one of the department's high-powered pursuit cars.

The arm extends the lights to 10 feet above the cruiser roof, providing a red warning light that can be seen around curves and over hills. At night it floodlights an accident scene, speeding rescue work and removal of wrecks.

To be used mainly on the Don Valley Parkway and Gardiner Expressway, the device was developed by Spar Aerospace Products Ltd. It is an outgrowth of an extendible antenna that Spar produces for satellites. □

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## municipal briefs

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Pembroke has applied to the Ontario Municipal Board for city status, it was announced last month. Mayor A. A. Campbell said the application covers the town of Pembroke "as it is constituted at present and does not deal with annexation of any additional areas." He said a study has revealed the municipality would save "thousands of dollars" as a city.

A former chief engineer of Burlington PUC's hydro department and former manager of the old Burlington Hydro system, Robert M. McKenzie, died at the Joseph Brant Memorial Hospital last month. He was 83. Mr. McKenzie was manager of Ontario Hydro's former West Central region until his retirement from that position in 1953.

Kincardine PUC has paid tribute to its chairman, David Kennedy, who has retired after 17 years. Mr. Kennedy was presented with a portrait and gold watch for "having given freely of his time for many years as a member of Kincardine Public Utilities Commission."

London PUC's former general manager, Dr. E. V. Buchanan, was one of 17 members of the Association of Professional Engineers of Ontario to receive the APEO citizenship award – a new medal presented to members "who have made a substantial contribution to humanity as citizens and members of the community." Dr. Buchanan retired in 1952.

Oshawa PUC's headquarters building is undergoing a face-lift to make room for a new computer. General Manager W. Bruce Annand said the equipment may be made available to other electrical utilities seeking computer time. The computer will be used mainly for billing and payroll purposes.

Wallaceburg Hydro will phase out its appliance repairs depot and get out of the retail appliance sales business over the next three months. The decision to drop the two services was made "in the best interest of the public and because there are other outlets to the public" for these services.

A 13-year dispute between Galt PUC and the city's largest employer over a billing error has been settled. J. M. Douglas, president of Babcock and Wilcox, has turned over a \$75,000 cheque to PUC chairman A. T. Hilton. Both men said the payment resulted from "amicable negotiations."

Hydro veteran, Albert "Scotty" Hamilton, 76, died in Toronto last month. Mr. Hamilton worked for Ontario Hydro as a line construction superintendent for 23 years before transferring to Forest Hill Hydro as superintendent in 1937. He held the position until his retirement in 1965. Forest Hill Hydro was taken over by Toronto Hydro a year after Mr. Hamilton's retirement. For many years Mr. Hamilton sang in barber shop quartets and a group of his barber shop colleagues sang a hymn at his funeral service. □

## speaking of pr

*The public relations activities of the municipal utilities are outlined regularly in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Tell the people means tell the staff, as far as Leamington PUC concerned. The commission has developed a means of keeping employees familiar with the utility's activities, changes in plans, and general information. It's all being done by a mimeographed newsletter, issued on a twice-a-month basis.

Entitled "Short Circuit," it usually carries five or six paragraphs on one page. Here are some typical items carried last year:

- Heating for the senior citizens' apartment at the OHC development has been switched from gas-fired hot water to electric baseboard – because of customer preference, we are told.
- Spring cleaning – it's that time of year – and our Hydro water crews have made tremendous improvements in the sewer centre yard. Drainage has been installed, gravel placed around the perimeter fence and cement-asbestos board siding installed along the south fence to stop washouts into adjoining properties. It makes a fine-looking job.
- Munsell grey is the new color for overhead line equipment. You will see this grey color appearing on switches, insulators, transformers and lightning arresters. This color has been accepted as a standard across North America.

There seems to be no end of material, according to the commission, that have come to our attention. It's probably the most economical way to achieve a well-informed staff, although management operation and an enthusiastic editor are prime requisites.

\* \* \*

Galt PUC publicly praised one of its customers in mid-February, says a report in the Kitchener-Waterloo Record. The homeowner spotted an overloaded switch glowing at the back of his property and promptly called the utility. Linemen arrived in time to take the device out of service before a power failure occurred.

Commission engineers said a power failure on that part of the line would have cost several hundred dollars and cut off power to several industrial users.

This type of story is commendable enough as it stands. Fully, it will also encourage other customers to act in a similar manner.

\* \* \*

The possibility of newspaper coverage should linger in the minds of utility officials every time a significant decision or achievement comes to their attention.

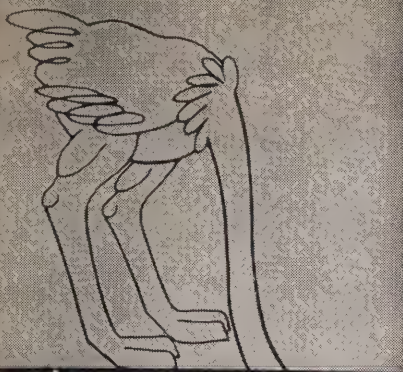
In recent weeks, for example, the Markham Economist and Review published a photograph and story of the local commission signing a record cheque payable to Ontario Hydro for power used during one month. The story reported new power derived from the local system and reminded readers of a new substation added late in 1969.

The Lucknow Sentinel recently carried a photo of a ladder and utility truck purchased by the local Hydro system. It was important to the utility's communications program, however, were details of the cost of the truck, and the price for which the old one was sold.

\* \* \*

In a move which demonstrates its concern and co-operation, Kingston PUC has arranged to include a message concerning drug misuse with all utility bills during a two-month period this spring. Working with an educational committee formed by the Kingston service clubs, the PUC's action will convey the information to about 22,000 customers.





as don wright sees it

Over the years we have managed to view a great many facets of society with alarm in these columns, but fashions in clothing have not been among them.

We've been aware of the gap, of course, but hesitated to fill it on the flimsy grounds that we knew nothing about the subject. This is a pretty outmoded approach, no doubt, in an era of protest such as ours, and taking our cue from the prevailing attitude, we'll sound off a bit on fashions with a clear conscience and an empty mind.

Besides, as one kind soul was quick to point out, ignorance has never held us up in the past. One of the biggest immediate threats posed by those avid people who determine the kind, color, cut and quantity of the material we'll use to cover our carcasses is their concerted attack on the mini-skirt. If these birds are successful, and they have never failed in the past, madame's hemline will fall about a foot by the end of the year and so will her bank account and our eyeballs.

For the first time, though, there is some hope at the couturières may have outsmarted themselves. Having allowed the ladies to disport themselves within an inch or two of the all-together or the better part of a decade, their belated and unconvincing appeals for modesty appear to be meeting with some resistance.

Reports from the fashion fronts confirm the conflict. Christian Dior, for example, intends to offer a choice: "mid-thigh for the young, between the ankle and calf for those who want a change of cut, in any case, the knee is completely outmoded as a reference point."

A pretty craven approach, we'd have to say, for a haughty a house and one scarcely accustomed to offering alternatives. As far as that reference point is concerned, we'll stick with our own, thank you.

Pierre Cardin is more affirmative, but he, too, is leaving a few important loopholes. His hemlines will go to the ankles, "as he follows his urge to conceal bare flesh," but the scallywag intends to lance this out with "dramatic peek-a-boo cut-outs in unexpected places."

Pierre's intentions may be admirable but his logic is enough to raise suspicion. Two or three strategic cut-outs could very well undo all the modesty provided by the extra yardgoods.

And we're pleased to learn that the pantyhose people are not panicking at the prospect of lower hemlines.

The mini-skirt gave pantyhose their big boost "for the sake of modesty," one industry spokesman observes, "but they are now worn as much for their comfort." He estimates that 50 to 60 per cent of American women wear these see-through hipwaders and reports that hosiery makers are now turning them out "as sheer as ordinary stockings with the sheerness continuing all the way up to bikini-type panties."

We always did wonder where those things ended up. Somehow we had the notion they went on forever after the fashion of a union suit and came equipped with knitted turtlenecks and buttoned down escape hatches.

But if hosiery people are happy, the girdle boys are feeling the pinch. Without stockings to hold up, their product is becoming superfluous except in those cases where June is busting out all over.

Things are also happening higher up on the fashion front. Apples are in and pears are out. One leading designer describes how the new look in bras for 1970 "brings the apex lower to a more rounded look with a wider separation." It is the shape of a young, firm bosom without a bra, he explains, "or more graphically, the bosom used to resemble a pear and now is more like an apple."

If that's the way it's going to be, you can bet the foundation garment industry will be equal to the challenge — and perhaps it's just as well. Left to her own devices, Mother Nature is apt to extend the range of fashion from the grape to the grapefruit. Frankly, though, if anyone seems likely to fall victim to the whims of fashion it's the male. Once immune to such frivolities, the poor goop is making up for lost time with fat ties, skinny pants and wild shirts.

It's reached the point where some gadabouts are throwing out perfectly good 20-year-old suits just because the trousers are pleated and sport a casual bagginess at the knee.

Likewise, with ties. Time was when gravy spots, of a hue tending to clash with the over-all color scheme, were the only acceptable reason for parting with a favorite neckpiece. Now anything containing less than enough material for a tablecloth gets the old heave-ho.

And have you been in the shirt section of a department store lately? Ask for a white shirt and the clerk is likely to turn pale and ask how long you've been in jail. Caught with a dozen or so white numbers ourselves before they lowered the boom, we're having them converted into jockey shorts with 33" legs.

It's all very sad and unless we recover our backbones in a hurry, we're almost certainly doomed by the same costly merry-go-round the ladies have been riding over the ages.

Come to think of it, we haven't exactly been tigers in resisting the built-in obsolescence provided by the chrome-and-fender crowd.

Another indication that the male may be slipping comes from Britain where thousands of government-sponsored posters showing a pregnant man dolefully clutching his swollen stomach have been inflicted upon the public eye. The posters, designed to focus attention on male responsibility in family planning, asks: "Would you be more careful if it was you that got pregnant?"

So far as we know, the question is purely

hypothetical and it behooves all of us to keep it that way.

Perhaps the posters are the government's answer to an earlier warning by Prince Philip that if the population explosion is not curbed, "Britons could become anti-sexual."

We can imagine no more effective way to blunt male interest in hanky-panky than the threat of morning sickness.

On the crime front, thefts of copper wire — on the increase due to rising copper prices — may have been ended once and for all by the drastic action of an Ottawa judge. In meting out suspended sentences to two local miscreants for the theft of \$600 worth of Hydro wire, he made it conditional upon them attending mass every Sunday for the next two years. Otherwise, it's off to the clink.

It's a tough choice, but that's the way it should be. Anyone foolish enough to tamper with dangerous electrical cable needs all the back-ground he can get in heavenly matters.

Sometime ago we suggested in these columns that Britain may have come off second best in its agreement to build a nuclear plant for Greece in exchange for tobacco. Apparently, the comment fell on responsive ears because tobacco has been dropped as a basis for negotiations and the talk appears to have switched to citrus fruits.

Details are not available, but it would seem to be a move in the right direction. Let's hope they can reach a mutually advantageous grapefruit-per-kilowatt basis for exchange. Vitamin C is greatly to be preferred over nicotine and health-conscious Britishers can be excused for refusing to have anything to do with filthy, germ-laden lucre.

Finally, we might mention a couple of mysterious goings on in the northeastern part of the province which have upset the local "citizenry" — and understandably so.

Item one involves the erection of sentry boxes at each end of a bridge connecting Ontario and Quebec about 40 miles northeast of North Bay. The government explains them away as security measures since the bridge is hard by a control dam governing the flow of water to several major power installations on the Ottawa River.

But rumors persist attributing the presence of the boxes to a worsening in Ontario-Quebec relations. Some envision an all-out attack by howling Separatists while others are inclined to dismiss them as just another inexplicable move in the incomprehensible game of bureaucratic chess.

More likely, the sentry boxes are intended to help stop the heinous Cosa Nostra activities which are thought to flourish in the area such as the smuggling of milk, margarine and gingersnaps between the two provinces.

Item two is even more serious. It concerns those "elusive and mysterious engineers who are prowling around in the north," to quote from one newspaper account, and are thought to be Americans with evil designs on Canadian water.

Whether or not there is any substance to these suspicions remains to be seen but Customs officers should be alerted to the situation. It would be easy enough for unprincipled tourists to slip back across the border with a bucket or two of our water resources sloshing about in their thermos bottles and radiators



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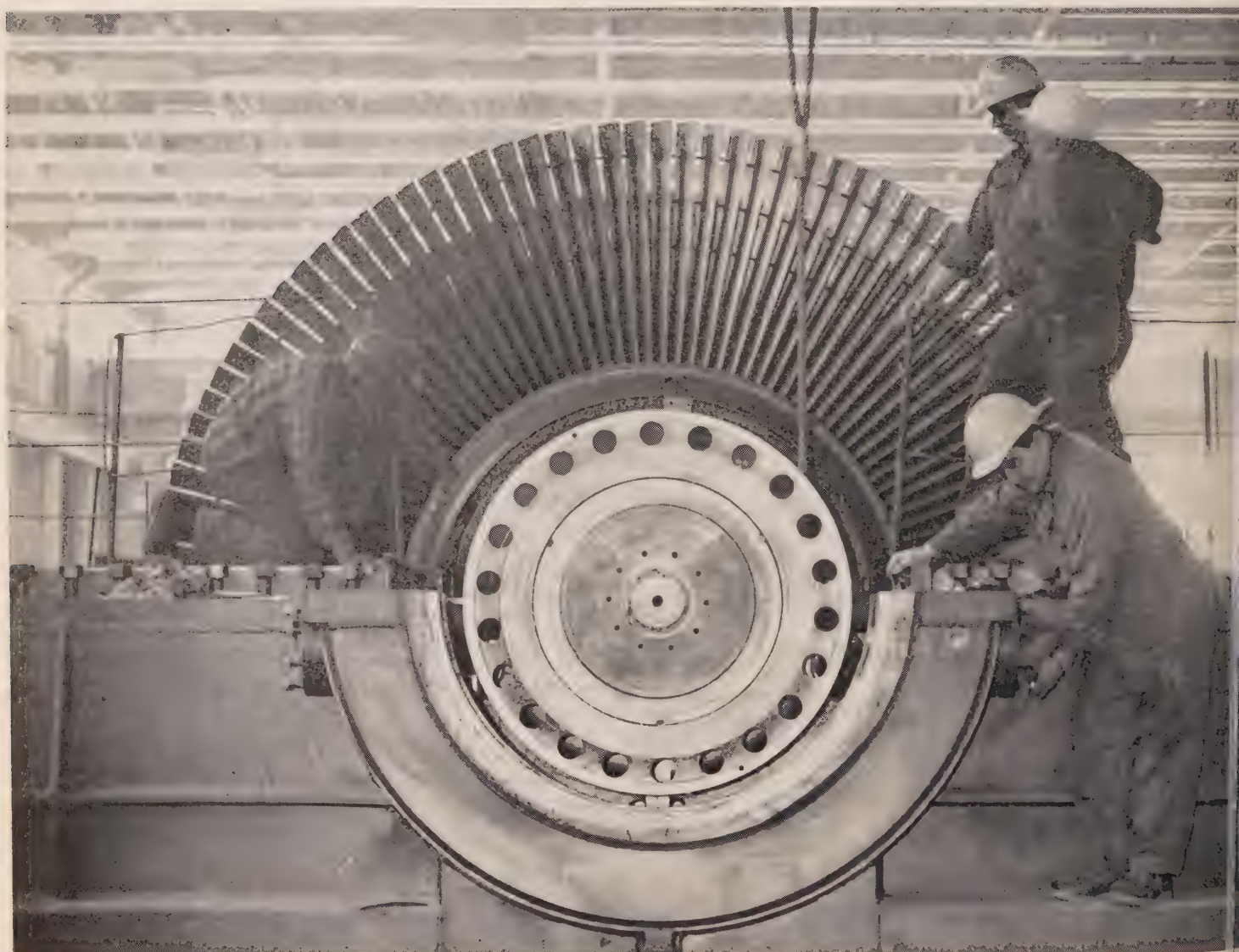
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## Power hunger

Ontarians have a king-sized appetite for electric power. To help relieve the hunger pains, Ontario Hydro has authorized an unprecedented generation construction program costing about \$2.5 billion. Pickering generating station where this huge turbine is being installed, will contribute more than two million kilowatts to the provincial power network.



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UNIVERSITY OF TORONTO

# ontario hydro news

may/1970





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### the cover

Poised dramatically against the evening sky, huge separation towers at the Bruce heavy water plant on Lake Huron stand like silent sentinels of the nuclear age. Harry Wilson took this photo while covering construction of the plant. More pictures on page 10.

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## Viewpoint

# instant electricity

Thanks to its multi-million dollar construction program and a mild slowdown in the economy, Ontario Hydro was able to gain breathing space toward the end of last year by attaining a power reserve of six per cent.

Because of the inherent disadvantage of electricity that it cannot be stored, an adequate reserve — the margin by which supplies exceed peak demand — is vital. Electricity is one of the few truly instant commodities. It must be available the moment a light is switched on or a motor started up. Any failure to deliver and the entire network may be forced into the "brown-outs" associated with dimming lights and shrunken television images or even into full-scale interruptions to service.

While a six per cent reserve is certainly preferable to the 0.35 per cent margin experienced at the close of 1967, it is far from satisfactory. Remarkable as it may appear, the annual growth in peak demands has remained fairly consistent over the years during prosperity, depression, war and recession. Promotional programs, too, have had little effect on the peak. Rather are they aimed at making year-round use of highly expensive equipment which would otherwise be required only a few days each year.

One important reason for more than a marginal reserve is the sheer size of modern generating equipment. Very real economies can be achieved by installing large but highly efficient generators in the province's new thermal-electric stations. Those going into the coal-burning plant at Nanticoke, on Lake Erie, and the nuclear station at Pickering, east of Toronto, will each have a capacity in the order of 500 megawatts. The capacity of the generators ordered for the even larger Bruce nuclear station on Lake Huron is 800 megawatts. Utilities south of the border are now bringing on line generators with the staggering capacity of 1,000 megawatts.

However, the contribution in terms of power to the grid of these goliaths is so great that the effect of losing one through mechanical breakdown or other cause will be substantial. The loss of a single 500-megawatt unit would all but wipe out the existing reserve built up by Ontario Hydro over the past two years. Further losses of generation around the time of peak demand could force system controllers to buy large blocks of power from Quebec or the United States. Assuming, of course, it is available.

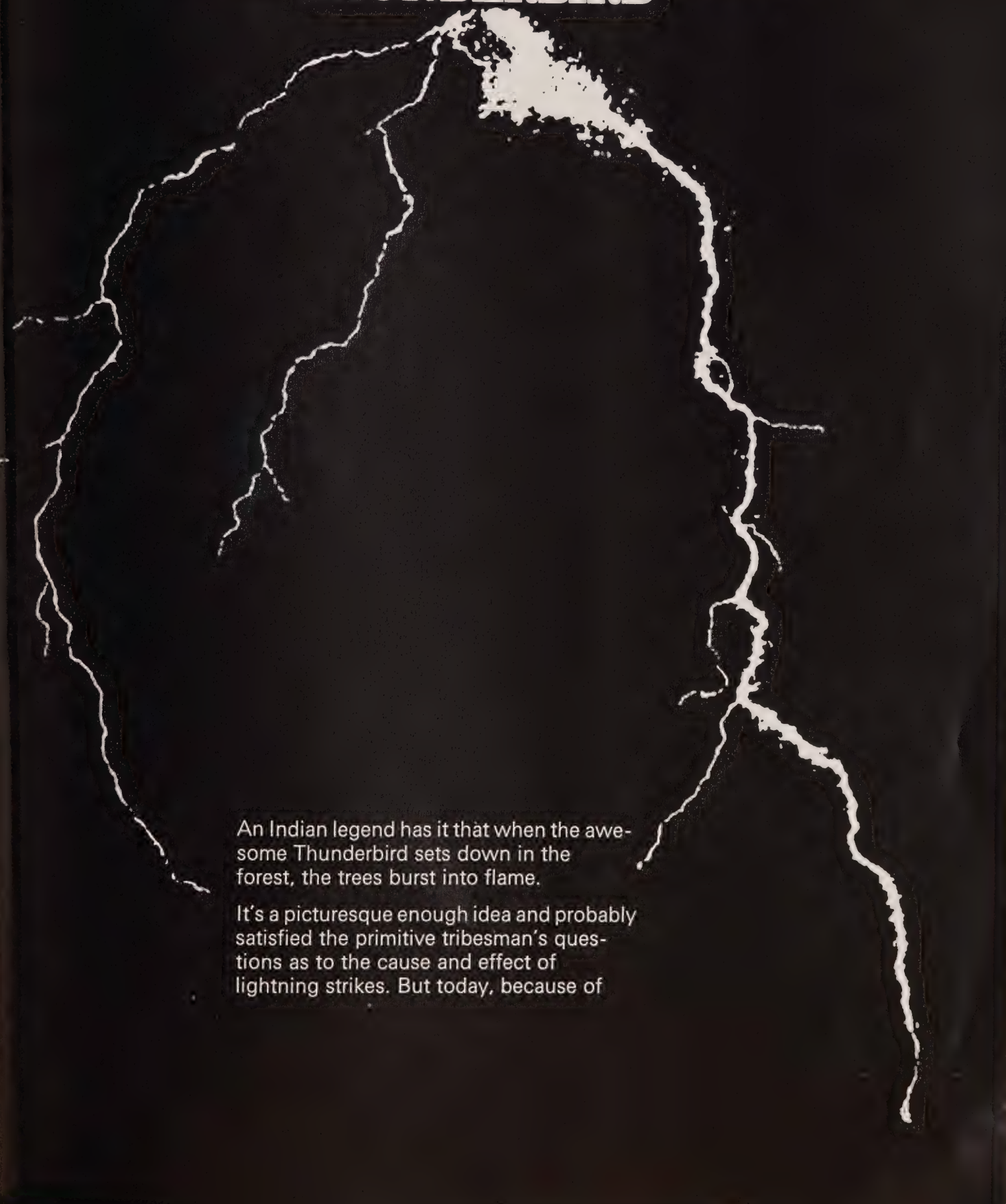
For electrical utilities across the entire continent are embroiled in a power crisis. Faced with the prodigious task of installing more new power capacity in the next decade than the entire industry has built since the light bulb was invented, they are hamstrung by late delivery of equipment, tight money, shortage of labor and, in this age of protest, changing public attitudes toward the siting of power stations and transmission lines.

Ontario is more fortunate than its neighbors to the south. It has more room to expand and its population is lower, though this is no excuse for building without thought or concern for people or the environment. Years of planning and study precede the announcement of a major generating site and engineering considerations, while important, must play an increasingly diminishing part in relation to these other factors. Yet power stations are necessary and they must be reasonably close to the major centres they serve.

Ontario Hydro's role in the years ahead is clear. It is to supply sufficient power to satisfy the needs of the customers with a comfortable reserve to cope with most contingencies. Anything less and instant electricity may become a thing of the past. □



# KEEPING TRACK OF THE THUNDERBIRD



An Indian legend has it that when the awesome Thunderbird sets down in the forest, the trees burst into flame.

It's a picturesque enough idea and probably satisfied the primitive tribesman's questions as to the cause and effect of lightning strikes. But today, because of



the havoc he can create at construction sites and to the supply of power, we need to know when the mythical Thunderbird will alight — and where.

Utility engineers have no illusions about the creature's predictability. Nature never produces two identical electrical storms, which makes the scientific forecasting of lightning's performance doubly difficult.

Detailed studies of lightning in the Toronto area, complementing information already gathered from other parts of the province, were started by Ontario Hydro in the early 1950s.

Arriving from his native Germany in 1952, engineer Hans Linck joined Hydro's research staff and immediately found himself involved with an experimental lightning detector.

Though his wide-ranging responsibilities now include surge protection and research into extra high voltage, he's been in the lightning business ever since.

As a result of these studies, Mr. Linck has become something of an international authority on the subject. As far back as 1958, he and H. M. Ellis, now BC Hydro's chief engineer, prepared a paper, "A Lightning Stroke Component Counter," which they presented in Paris to the Conférence Internationale des Grands Réseaux Electriques à Haute Tension. This described an experimental model combining optical and electro-magnetic measurements of lightning discharges. The work was subsequently discontinued in favor of a simpler and more effective method — the recording of low frequency radio disturbances.

Being an expert on lightning isn't all storm-watching and trips to Paris, however. Mr. Linck recalls the time he was called to testify against a motorist charged with speeding on a provincial highway. The motorist claimed that the stopwatch used by the police in their spotter aircraft had been upset by a thunderstorm at the time. Mr. Linck felt he was unable to support this theory, since the watch was non-magnetic.

Having tried and rejected several different principles, Mr. Linck has now developed a simple, transistorized lightning "clock"

which "strikes" each time there's an electrical discharge anywhere within its 100-mile range. In fact, it's a low frequency radio receiver, the amplified output of which is fed into a counting device. The rate at which the flashes are recorded indicates the storm's severity.

Mr. Linck used reports on the distance and severity of the thunderstorms phoned in by station operators across the province to Hydro's system control centre at Richview, in northwest Metropolitan Toronto, to calibrate his invention. Over 20 individual storm observations were correlated in 1967 alone.

Development of a practical detector was complicated by the fact that it must distinguish between man-made and natural discharges. However, the transistorized receiver is so designed that it is relatively immune to the type of power surge which might occur at generating or transformer stations. Yet the device is so sensitive to the real thing that the receiver-amplifier can produce an output up to four volts from a signal of only 10 millivolts at the simple rod antenna.

Indian mythology shows that even the earliest tribes recognized two kinds of lightning, known today as cloud-to-ground and cloud-to-cloud discharges. While the latter have no adverse effects at ground level, they do influence radio reception. They generally precede cloud-to-ground discharges and their presence can be a help in predicting storm paths.

The characteristic frequency at which their power is unleashed is different from that of discharges to ground and Mr. Linck's 125kHz (that's 125,000 cycles per second) detector gives a better indication of their presence than detectors tried at lower frequencies.

This bonus means that developing storms can be detected anything from 10 minutes to one hour before warnings are received from other sources. With over 20,000 circuit miles of transmission line spread throughout the province, such advance warnings can be critically important to Ontario Hydro and plans are under way to equip major generating and transformer stations with the new detector. A modified version, signalling the development of a sneak local storm, is in use on the site of the Pickering nuclear power station, near Toronto.

When a storm warning is sounded, safety superintendents at construction sites may order crane operators from their cabs.

Men working on steel-reinforced concrete will be called off the job as will any others working where metallic materials could possibly serve as conductors.

And at Richview control centre, the system supervisor will attempt to reduce load on lines in the path of the storm minimize the effect of any interruption to service.

The trend to longer spans between transmission towers and the consequent need for higher towers has increased the possibility of lightning strikes, although they do not necessarily mean an outage. Line-shielding and tower-grounding techniques can reduce if not eliminate its effects.

On Hydro's extra high voltage lines, for instance, the careful installation of sky shield wires connecting the tower tops and the use of sophisticated insulators built to withstand the tremendous electrical potentials involved seem to have prevented lightning damage on these vital supply lines.

Where lines have to be carried over solid rock such as exists between Sudbury and Thunder Bay, the grounding of towers in the conventional manner becomes all but impossible. In such cases a "counter-poise" or ground wire system which can cost several thousand dollars a mile must be adopted to offset the high tower footing resistance.

At this time of year, the Thunderbirds start migrating back to Ontario. Hans Linck's detector won't scare them away or even prevent occasional interruptions to the power supply. But it's likely to make a significant contribution to the safety and reliability of Ontario's power network.

*Hans Linck examines record of lightning strokes. Right: receiving antenna at Pickering nuclear power station forms part of system to warn construction workers of approaching thunderstorms.*









# you don't take it with you!

by Rae Hopkins

Tom Jones noses his 1967 station wagon out of the downtown Detroit parking lot and heads straight for Interstate 94. His day's work is done and he's headed home to Anchor Bay, about 35 miles north of the city.

"Used to live in the city," he says, "but the wife and I got a little sick of the rat race. We've got a couple of kids, you know, and apartment living is for the birds."

"So we were out one Sunday afternoon for a drive and we saw this mobile home town. It looked pretty good and we decided to kill an hour and look around. When we found out how much less it would cost us to buy one and how much it would save us on rent we decided, almost then and there, to take the plunge."

"I'm just a working man, you see, so for me suburbia's out. No way can I try to keep up with the Joneses . . . oops."

"Besides," he adds, "it's a nice town. There's everything you could want around here . . . swimming pool for kids."



*Mobile home communities such as this one at Anchor Bay, Mich., are springing up across the US and the trend is spilling into Ontario. Advocates say well-groomed appearance inside and out provides for "good living at a reasonable price."*



table right there in the rec centre . . ."

Tom Jones and his family typify a host of others in urban centres throughout the country — they're making a mass exodus from apartment living to mobile home community life. And thousands — particularly young couples — are giving up conventional housing to establish residence in mobile home subdivisions. Younger families starting out are buying them, too.

Tom Jones says, they're "nice places."

What's happening in Michigan is spilling into Ontario, especially into nearby Essex County.

Similar subdivisions are springing up and people feel that if a solution is to be found to the nation's chronic housing problem the mobile home townsite will be a major contributing factor.

However, before developers can achieve any measurable degree of success they have dozens of problems to overcome, the chief of which is ignorance. Officialdom still tends to regard the mobile home community as a trailer park of transients. But this is not the case. A mobile home subdivision is exactly what its name implies — a community. Perhaps the only real difference between a mobile home and a conventional house, says Ontario Hydro's Essex area manager Bill Watson, is its means of transportation to the site. A mobile home is brought in on wheels, and a conventional house is fabricated on site.

And, he adds, the word mobile is a bit of a misnomer. Very rarely are the homes ever moved once they're in place. Matter of fact, the wheels and hitch are even removed and should the owner decide to leave the subdivision he usually sells his home.

One US utility, the Georgia Power Company, has been successfully servicing

mobile home subdivisions for several years. R. C. Bythewood, manager of the company's market development department, says a vehicular home on wheels isn't a mobile home. It's a travel trailer. He says a mobile home is designed, built and intended for permanent year-round family living and is seldom moved during its lifetime. Their size no longer permits movement by the family auto — they must be hauled to the site by commercial home-movers.

Another factor which distinguishes the mobile home community from a trailer park is its well-groomed appearance around the dwellings, well-lighted, curbed streets and a stringent "no mess" set of rules. All services are provided underground, and the mobile home community is a natural for all-electric living. That, in itself, spells cleanliness.

More than 200,000 mobile homes were sold in the US in 1965 with a 15 per cent increase in sales in 1966. The following year, they accounted for 20 per cent of all





new residential units. Production of close to half-a-million units annually is anticipated by 1975. In the US today, a family moves into a new mobile home every 30 seconds.

They offer the owner comfort and an environment equal to that obtainable in most conventional housing. Every mobile home comes completely furnished, ready to live in — and can be purchased for between \$8,000 and \$9,000 for the two-bedroom models to between \$12,000 and \$14,000 for three bedrooms and larger.

Another factor which points to them as a partial solution to the housing problem is that they can be purchased for a down payment of \$2,000 and the highest monthly payments would be \$145 for a 10-year period. In Windsor, closest metropolitan area to Ontario's mobile home communities, the minimum cost of a two-bedroom house is approximately \$24,000 and the purchaser requires a minimum down payment of about \$6,000 with

payments over a 25-year period of \$150 a month.

Mr. Watson says the biggest problem electrical utilities face is getting mobile homes manufactured with 200-amp service to accommodate electric heating. Some US and Canadian manufacturers are used to installing 50-amp service, although they're gradually shifting to the heavier service already provided by most Canadian producers.

The Essex area manager believes mobile home living will definitely catch on across the province. "It has to — it's our answer to medium or low-priced housing. The price of a conventional home in Essex County starts off around \$25,000 and increases with the cost of land. When you add high interest rates and high taxes, what working man can afford it?" he asks.

Mr. Watson says electrical utilities in the area are capturing about 40 per cent of the mobile home market right now and "that should increase greatly as manufac-

turers switch to 200-amp service." He estimates there will be 500 units in the county within the next two years, and every one of them is a potential all-electric dwelling. Developers won't allow unsightly fuel tanks and all services are underground, anyway.

The average electrically-heated mobile home has a load of between 10 and 15 kilowatts while an all-electric convention home consumes on the "high side" of these figures, says Mr. Watson.

He adds that the all-electric concept is really catching on in homes of between 1,000 and 1,200 square feet in area. Topping the buyers' list today is the central heating concept which provides for heating, cooling and air cleaning. Air conditioning is installed in the same ductwork, built into the walls and floor, which carries warm air during the winter months and the central furnace is placed inconspicuously in a hall closet.





*Wide-paved streets and complete underground services give permanence to the mobile home townsite. There's real community spirit, too, and most subdivisions come complete with a recreation centre where residents can relax in the evenings.*



Anchor Bay, a model community, are more than 200 homes now occupied and projections are for 1,400. A shopping centre. Park manager Koeller, who himself sold a \$25,000 conventional house to live there, says "There's real community spirit in the town. None of this dog-eat-dog stuff you find in a conventional home subdivision."

He adds that maintenance around a mobile home is somewhat less than a conventional house. "All you have to do is wash down the wood-panelled walls and run the vacuum cleaner — there's none of the painting inside and out all the time."

Charlie Webb, a pioneer developer in Essex County, calls life in Webbwood "good living at a reasonable price." He caught on to the idea of a mobile home subdivision after a vacation trip through the US while he was working as an analyst for an automobile manufacturer.

Webbwood, nestled on Highway 39 where it crosses Pike Creek, will feature complete underground services, a community centre "country club style" and all its 36-foot wide streets will be paved, curbed and have sidewalks and ultra-modern streetlighting.

Mr. Webb says the future of housing has to lie in mobile units because people can't afford to keep paying 35 or 40 years for conventional homes — and taking a chance every month of losing it or dying before it's paid for.

The average occupancy of mobile housing today is 2.5 people per unit and right now the biggest demand is for two-bedroom models. However, there are some in Webbwood that have as many as four bedrooms.

"We think that communities such as ours will be one of the major steps in solving the housing shortage," Mr. Webb says, "but all levels of government must take a long, hard look before anything concrete

can be done. They must realize these are homes, not trailers. They're located in subdivisions, not trailer parks, and, therefore, they should be eligible for NHA mortgages and free from provincial retail sales tax, just as a conventional house is exempt."

At present the buyer has to find outside financing and pay sales tax, about the only major drawbacks in the "new life." Although the mobile home community in Ontario is still in its infancy, the town of Essex, population 3,600, is already experiencing growing pains. In the southwest corner, a development called Viscount Estates is beginning to take shape and when it's finished will accommodate 300 units.

That will boost the town's population by a third. □



# Not an Atom of Difference

True. One tiny neutron makes all the difference between ordinary water and deuterium oxide — the substance more commonly known as heavy water that nuclear power plants use to quench their thirst.

Certainly, there's a lot less fuss to pouring a glass of water than there is to satisfying the palate of a nuclear station. Every time you open a faucet heavy water flows down the drain, but ordinary water contains only one part in 7,000. And it's only economical to extract one part in 30,000.

At \$20 and more a pound, heavy water's costly. But it's vital to Canada's nuclear program. Deuterium oxide ( $D_2O$ ) is used to both slow or moderate the fast neutrons produced in the fission process and to transfer heat from reactor to boiler.

Atomic Energy of Canada Limited's heavy water plant under construction at the Bruce nuclear power development on Lake Huron will begin to supply the "liquid gold" in 1972. Full 800-tons-a-year production will be reached in 1973. Even at that, its output is already "booked up" several years ahead. Bruce generating station's four units will each require 600 tons for initial loading and the huge plant



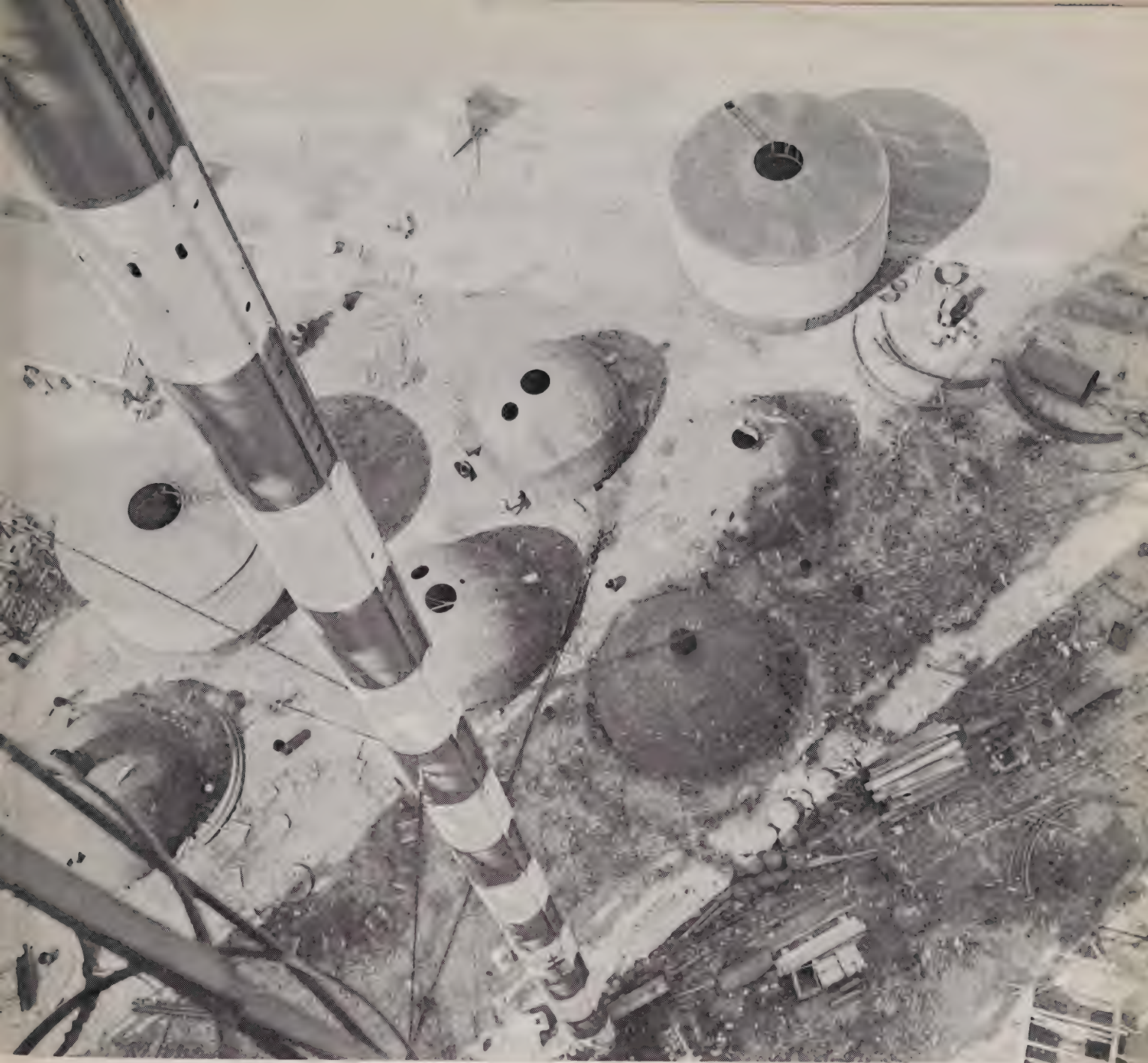












*View looking up and down the 300-foot separation towers at the Bruce heavy water plant. Dome-shaped caps for each tower are waiting to be hoisted into position.*

at Pickering, east of Toronto, will need about 2,000 tons to bring its four units on line. Then there's the nearby Douglas Point station, NPD at Rolphton, Gentilly in Quebec and stations in India and Pakistan, all of which employ the Canadian heavy water-moderated, natural uranium concept. However, two other heavy water plants at Glace Bay and Port Hawkesbury in Nova Scotia will also be meeting the demand of the seventies and beyond.

About 120,000 gallons of water a minute will be drawn from Lake Huron at the Bruce plant for the separation process. Part of it will be pumped into huge steel columns, called separation towers, and deuterium

oxide extracted in a series of steam-heated and cooling towers.

Hydrogen sulphide will be fed into the plant where it will contact ordinary water in a steam-heated tower to become enriched with deuterium atoms. The enriched gas is then bubbled through water flowing down the cold tower and the deuterium atoms are transferred to the water.

Right now, the three 330-foot first stage towers are nearing completion at the site and the 300-foot second stage assembly is not far behind. The third stage towers will be only 10 feet high.









As pets, fish have a lot going for them. They don't bark, they don't bite the mailman or meter reader and they don't require shots.

# THE AGE OF AQUARIUMS

by Paul Chisholm

In an age of sadly polluted streams and lakes, one species of fishes is alive and well and thriving in the urban environment.

Its members come in dazzling riots of color, in soft single hues and in a multitude of shapes and sizes. They're all lumped together under the general designation of tropical fish although, for the record, some of their numbers have been adapted from chill mountain streams rather than warmer climes.

Whatever their origin, the collecting, caring for and breeding of fishes in household aquariums has attracted hundreds of thousands of adherents throughout North America. In fact, Charles Drew, of Burlington, an official of the Canadian Association of Aquarium Clubs, puts fish-keeping as the third most popular hobby being superseded only by stamp and coin collecting.

Urban togetherness and the trend toward apartment living are undoubtedly important factors in making the home aquarium fashionable. Fish tanks are also popular decor in business offices, clubs and hotels.

"Compared to other pets, fishes fit compactly into the smallest area," says Mr. Drew. "They require minimum care, and a tankful of healthy fish contributes color and serenity to the home."

Fish have a lot more going for them. They don't bark, they don't bite the mailman or meter reader and they don't require shots. Nor do they mess the neighbor's lawn or spend half the night meowing on the back fence. And they are not outlawed by apartment leases.

Cost is another important item. Beyond the goldfish bowl category, a hobbyist can establish a basic aquarium, complete with pump and filter, for as little as \$15. Add a few plants and the "aquascape" becomes something of a garden substitute for the high-rise dweller.

The size and shape of the tank, and consequently the amount of water surface, determine the number of fish it can support. Fish, like lunged land creatures, breathe oxygen and exhale carbon dioxide. Plants do just the opposite, and their presence in an aquarium extends the number of fish it can hold.

The addition of electrical and mechanical aids provides a completely self-sufficient environment. Immersion heaters, usually consisting of a glass-enclosed electric coil built to various wattage specifications, maintain water temperature in the ideal range between 72 and 80 degrees Fahrenheit. Bubbles introduced by aeration devices will help oxygen to penetrate the water surface and aid circulation. Various filter systems can be attached to these mechanical pumps, keeping the water sparkling pure.

Another contribution of electricity to the fascination of fish-keeping is lighting. Lamps are usually installed in the aquarium

photos by Bob Armstrong



cover, which keeps cats out, jumping fish in, and ensures that the water surface is clear of dust, smells and household vapors. Lighting not only helps the plants to grow, but adds to the beauty of the aquarium, particularly in a darkened room.

Fish-keeping sophisticates in many Canadian centres meet together in aquarium clubs aimed at furthering the hobby through greater understanding of breeding techniques, exchanging ideas on raising and caring for their pets, and conducting competitions and fish sales. Members expound at length on their theories and experiences in club publications with such intriguing titles as "Wet Pet Gazette," "The Fish Fancier" and "Finfun." These publications are widely exchanged with other clubs, nationally and internationally.

In all, 17 clubs are affiliated with the Canadian Association of Aquarium Clubs – most of them in Ontario. But their members account for only a tiny minority of aquarium owners.

"A survey conducted by a leading Toronto aquarium supplier revealed a ratio of less than one in every 200 customers is a member of an aquarium club," says Mr. Drew.

"But, as an indication of the popularity of the hobby, it's estimated that in Toronto alone half-a-million fish change hands commercially every Saturday."

Most fishes available in North America are supplied from commercial fish farms in Florida where they are bred or imported from every corner of the globe. Just how many species of aquarium fish there are, and how many varieties of species, is anyone's guess.

"New species are recorded weekly and new strains are constantly being developed commercially and by hobbyists," says Jim Fowler, of the Scarborough Aquarium Society. "There's no way of knowing exact totals."

The authoritative "Guide to Tropical Fishkeeping," by J. H. P. Brymer, contains a partial listing of 1,300 fishes. But usually only a few hundred species are in vogue at any one time and are readily available on the market, Mr. Drew points out.

Most varieties of aquarium fish are less than three inches in length, although some are twice that size or longer. Popular species retail at anywhere from a few cents to \$1.50. In a few instances, ardent hobbyists have been known to spend up to \$1,000 for a particularly rare specimen.

Whether sporting whisker-like feelers sometimes longer than their own bodies,





Whether clean-shaven and trim-headed, aquarium fish have varied characteristics and habits ranging from kissing to killing. The kissers, with protruding lip peelers, buss all objects they contact, including tank mates. The killers include species bred in Asia for their fighting prowess. There they are matched in public battles much like the cock-fights in other parts of the world.

There are elongated fish, pencil-shaped fish, square-bellied fish, transparent fish, leaf-shaped fish and fish-shaped fish; jumpers able to clear the water by several times their own length; air-breathers able to climb out of the water and take a stroll; fish destined by nature to eat and sleep upside down (for no apparent reason) and electrified fish able to pack a wallop sufficient to kill adversaries or jolt man.

Head-tempered by nature as well as in appearance, the man-eating piranha is renowned for his jawful of razor-sharp teeth. In their native South America, schools of these fish have been known to rip a horse to the bone in minutes. Needless to say, the captive piranha is kept alone and handled with care . . . and a special plastic net is recommended in most manuals.

Generally speaking, though, most aquarium fishes have gentle dispositions and are known to hobbyists as "good community fish." Which means they are able to share a tank with other species.

Keeping fish as an object of beauty originated in the Orient, where ponds stocked with colorful species were part of the ancient garden setting. In Western society, the cult of aquarium-keeping is comparatively recent, gaining popularity a little more than 100 years ago.

The keeping of salt water fish is a specialized area gaining increasing popularity in North America and elsewhere. Varieties are even more exotic in brilliance and form than fresh water species, but the hobby is trickier because of the difficulties maintaining sea-like conditions far from the ocean.

Fishes, fresh or salt water, are among the most pampered pets today. Catering to their every whim are well-stocked aquarium suppliers in most urban centres. These stores offer such goodies as objects to decorate the fish tank or improve its environment, chemicals to better the condition of the water, nutrients for healthier fish, and colored gravel and sand.

And to tempt jaded palates, how about freeze-dried shrimp, worm or beef heart?

□





# plugged-in patients

by Sheila Kenyon





"Hey kid, shouldn't you be in school?" asks the driver as the small muffled figure squeezes past a fat lady and gets off the bus.

The youngster limps off up the road, kicking a dixie cup with his good foot. Suddenly, he lifts his head. Electric doors open at the touch of his sore foot and he looks at the emergency department sign and reflects that he got "emergency" right in his last spelling test.

"Hello, Jimmy," the uniformed security guard gives him a warm greeting. "Hi!" The receptionist's smile is that of an old friend. "Everything is ready for you in the emerg. You'll soon be home for lunch."

Every day, thousands of Canadians pass through electric doors into a world where the advances of electronic technology are revolutionizing hospitals. In practically every department and in every facet of treatment, electricity plays an important role. For Jimmy, who is one of some 2,000 other male Canadians who suffer from hemophilia, a trip to the local hospital is as familiar as a walk to the corner drug-store for gum.

Today, Jimmy can live a regulated yet almost normal life thanks to modern technology. He's on his way to get an intravenous injection of a vital substance called Factor 8. Because of this missing factor, hemophiliacs suffer from an impaired coagulability of the blood and bleed more readily than normal people. Pain in his ankle is a sign for Jimmy that something is amiss.

When Jimmy's doctor phoned the hospital's department of hematology, a technician removed the plastic packages of concentrated Factor 8 from the deep freeze where they had been stored at -60

degrees, thawed the contents and gave them to the team awaiting Jimmy's arrival.

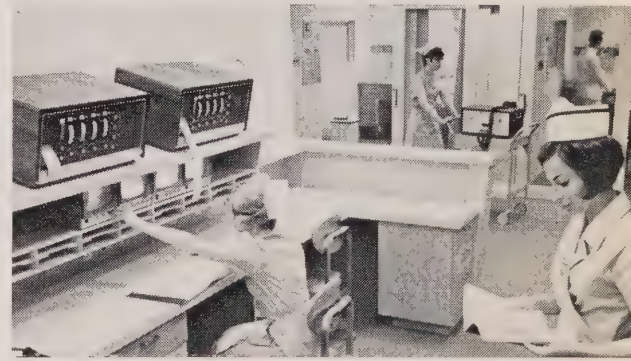
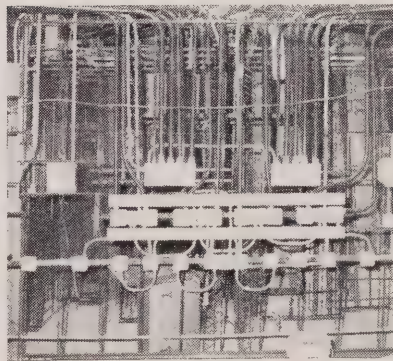
While electric power plays a small but vital part in allowing the hospital to store perishable commodities like Factor 8, its role in regard to medicine as a whole has developed into an important science in the last decade.

Eight floors above University Avenue, in the hustle of downtown Toronto, Dr. D. J. Shepley, director of medical engineering and computer services at the Hospital for Sick Children, is in charge of a team of 40 technologists and medical engineering specialists working in this new field.

Dr. Shepley is both an engineer and a medical doctor. He holds a BA Sc in electrical engineering and an MD from the University of Toronto. After interning at St. Michael's Hospital he worked in data processing with the medical team of IBM. Not only is he a member of the Ontario Medical Association and the College of Family Physicians, he also belongs to the Institute of Electrical and Electronic Engineers.

He sees the new discipline made up of several sections and, although his team is carrying out work in only two of these, other research is going on at various centres across North America, including Dalhousie University, the Institute of Biomedical Electronics of the University of Toronto, Toronto General Hospital, and leading US medical establishments.

At all these centres doctors trained in various other disciplines are investigating and developing new electric and electronic equipment. Studies are being undertaken to determine how best computers can serve hospital and medical research needs. Bio-physics, bio-mechanical engineering and bionics —



*Sensitive electrical and electronic equipment is essential to modern medicine whether it's in the study of dizziness, far left, or experiments on tissue preservation. Other photos show monitors in the coronary care unit at Toronto's East General Hospital and what lies behind the control panel.*



the study of biological organisms and its application to engineering — are all included.

While medical engineers are working to develop new equipment, hospitals are incorporating all the electronic and electrical aids available. Primarily, they are used as tools to increase efficiency, aid diagnosis of disease, and improve nursing and medical care.

According to Dr. G. D. Hart, in charge of the hematology department at the Toronto East General Hospital, new electronic equipment used in his laboratory is "increasing the efficiency and the accuracy of testing the number of blood and other tissue samples that can be handled by technologists."

The East General Hospital, like a good many other hospitals, uses an instrument called a Coulter Counter to replace no fewer than five machines. It carries out routine blood testing, reporting by automatic print-out in 20 seconds. The same group of tests previously required about 37 minutes to complete.

Not only is electronic equipment speeding investigation, but electronic monitoring devices have become life-saving tools to medical and para-medical teams.

Across Ontario, hospitals in large centres have or are opening coronary care units, or are utilizing coronary care monitoring devices in intensive care departments in smaller centres. One of the most modern coronary care units was opened at the Toronto East General Hospital in 1969, at a cost of \$300,000. Hospital officials estimated the unit could reduce death from heart attacks by 30 per cent, primarily by specialized nursing care.

Once admitted to the unit, the patient undergoes continuous electronic monitoring of his heartbeat. Electrical tracings of the heart's pulsations are visible on TV-like screens, one of which is located at the patient's bedside and a second at the central nursing station.

The East General unit consists of eight rooms with sliding glass door fronts, opening on to the central nursing station. Patients not directly visible to this nursing station are watched by the nurse over closed-circuit television. If a heart rhythm complication occurs, an alarm system will immediately warn the nursing team, which is trained to respond within seconds.

In order to record the complication, the monitoring device has a built-in memory that automatically records the irregular tracings of the heart during the one or two minutes preceding the alarm and after the alarm sounded. This enables the doctor to study the crisis period. Monitoring of the





heart rhythm allows doctors to recognize abnormalities and prescribe treatment that will bring the heartbeat back to normal.

With all this new medical apparatus, the role of the hospital electronic engineer is becoming far more important. Most hospitals require technicians on staff to operate and maintain equipment.

To assist patient-nurse communications, the new York-Finch General Hospital in North York has introduced on each floor an administrative control centre similar to the nursing station in other hospitals. Each control centre is manned by an operator in direct communication with the patient. The operator is trained to deal with patients' queries and, if the situation requires nursing attention, she contacts the nurses' team-leader by means of a pocket page system. Each nurse team-leader and member of the medical and senior staff carries an electronic page.

Another innovation in communications is the use of pneumatic tube systems, some computer-controlled, for dispatching and delivery of small items like medicine, X-rays, orders for treatment and office communications from one hospital department to another. Pneumatic systems are also being developed to dispatch dirty linen directly to the laundry.

Use of computers in the hospital field is relatively new. Wolfgang M. Schmitt, comptroller of the East General Hospital who has pioneered data processing

systems and their application to hospitals in Toronto, says that if all the know-how used in getting man to the moon and back could be harnessed it would make a tremendous impact on computer application.

Mr. Schmitt and his staff, in co-operation with the National Cash Register Company (Canada) Ltd., developed a standardized payroll analysis program now in force at the East General Hospital, the Queensway Hospital, St. Joseph's, Scarborough General, Wellesley and other hospitals in the Metropolitan area. Several hospitals outside Ontario have adopted the system. The hospitals do not own computers, but purchase time from private computer companies.

Mr. Schmitt predicts that hospitals in Metro may, through a cost-sharing arrangement, operate two computers — one in the east and one in the west part of the city. The computers would be linked together as well as being linked to every hospital. All types of patient data, including medical records, could be stored and readily retrieved.

The maintenance of individual patient records is another area being examined. Computers may be the answer for the provision of a medical history on every Canadian citizen from birth to death. A sub-committee of the Ontario Council of Health, of which Dr. Shepley is a



*Built to radiate a minimum of heat, the operating room lights at York-Finch General Hospital are the latest of their kind in North America. Push-button bed that adjusts itself to the patient's needs is also a feature at York-Finch.*



member, is examining what pertinent information should be stored, the legal aspects of storing private medical records, and is looking at where this type of information should be located. In addition, a pilot project to evaluate the role and usefulness of computers in hospitals, either singly or on a shared basis, is under way at the Hospital for Sick Children. Many administrative chores at the hospital are already handled by computer and plans are being developed to share both the systems and the machine initially with St. Michael's and Sunnybrook hospitals.

Dr. Shepley's team has also developed a system by which a patient's medical data from a number of different sources can be programmed for later reference by the physician. It is thought, however, that no single computer will meet all the needs of a group of hospitals. A combination of larger centralized computers along with smaller decentralized machines may be the ultimate answer.

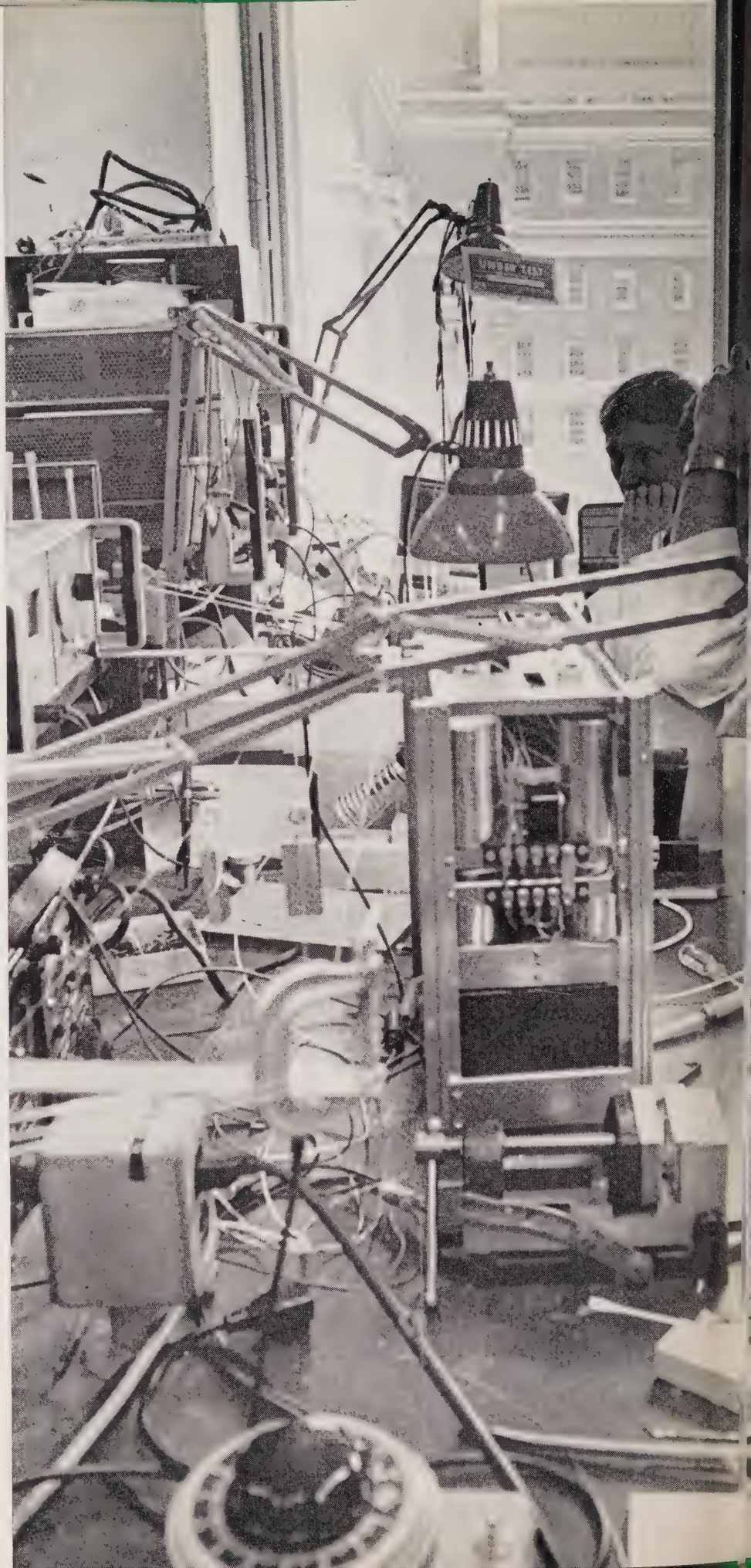
In the 70s, hospitals will incorporate more and more electrical and electronic equipment and aids. Equipment is constantly being developed to speed up service and improve efficiency from the emergency department to the nursery where newborn babies are kept in temperature-controlled environments.

Instruments like artificial limbs and internally planted heart pacemakers are making individual lives more satisfying and aiding the handicapped toward a more normal existence.

But what is commonplace to a nurse working in a coronary care unit may appear terrifying to a patient's relatives. "We must not overlook the important role of the nurse and the communication she must develop with her patient and the patient's relatives," says Miss Carol Adams, director of professional development for the Registered Nurses' Association of Ontario. "Nurses working with tiny babies kept alive in incubators tell me they feel it is important to keep the awareness that it is a human being — a baby — they are caring for, and not an extension of a machine.

"With all the new equipment and innovations to aid patient care we cannot lose sight of the most important factor — our patient," says Miss Adams. □

*Problems of medical engineering are worked out in laboratories such as this at the Hospital for Sick Children in Toronto.*





# Along Hydro lines

## heads Ottawa utility



*Lloyd Askwith*

F. L. G. (Lloyd) Askwith has been appointed general manager of Ottawa Hydro to succeed Fred G. York, who died in February.

Mr. Askwith has a long association with the Ottawa utility. He first worked as a summer student on line crews and as a substation operator for the former Ottawa Light Heat and Power Company. After graduating as an engineer from Queen's University and subsequent naval service during the second world war, he joined the distribution department of the Gatineau Power Company. He moved to Ottawa Hydro in 1951 as assistant stations engineer. From 1952 until 1955, Mr. Askwith was distribution engineer. He was subsequently appointed assistant chief engineer then assistant general manager and chief engineer in 1969. Mr. Askwith was 1968-69 president of the AMEU and has served as chairman of three of its four boards. He's still a member of the president's council.

Other Ottawa Hydro appointments include E. J. Murphy, assistant chief engineer, A. D. MacLeod, distribution engineer, Ham Chisholm, distribution design engineer, Carl Kropp, underground construction engineer and John Kwan, overhead construction engineer. □

## Office boy remembers

Back in 1919, young John Grant wasn't "one of the elite" who could afford to go to high school. So he packed up his books and went to work as an office boy for Toronto Hydro.

Last month, Mr. Grant was presented with a gold watch on the occasion of his retirement — the fourth Toronto Hydro employee to reach the half-century plateau. And the presentation was made by McDonald White, retired assistant general manager, who received his own commemorative timepiece in 1967. General manager Harry Hyde stepped aside in favor of "the father of our dear club" when the time came to make the award at the club's annual Quarter Century Club banquet.

Mr. Grant spent most of his time in the service department and went on to purchasing a dozen years before he retired. Looking back, he's seen a lot of changes around Toronto Hydro and around Toronto itself. One of particular note, he says, is the lack of overhead wires feeding streetlights in the downtown area.

"Back when I started, there was just a tangled network of wires all over downtown. We had wires going to the streetlights,

wires feeding the trolley lines, and wires going everywhere. That's all changed now," he says.

Another innovation is the mode of transportation for employees. In his early years, the men had to get around on bicycles — some had motorcycles with sidecars for equipment hauling, "but not me — I exercised my option and rode the streetcar," he adds.

"Sure," Mr. Grant says, "if I had it to do all over again I'd go to work for Toronto Hydro. They sure were good to me over the years."

Fifteen new members were accepted into the Quarter Century Club and presented with 25-year pins at the dinner and 22 employees received 40-year pins.

Among the speakers were Toronto's Mayor William Dennison, former chairman John McMechan, J. Corrigan, Quarter Century Club chairman, and Mr. Hyde. □

## Introducing the president



*Gavel gift*

It was Douglas Gordon Hugill night in the Sault.

Sixty municipal and business officials turned out at Sault Ste. Marie to honor the new president of the Ontario Municipal Electric Association — the second from District 9.

The president's dinner is held annually in the OMEA leader's home town to help make the community aware that one of its citizens heads up the province-wide association of municipal electric commissioners.

Among the speakers who paid tribute to Mr. Hugill were AMEU president H. J. Murphy, past OMEA president J. R. Philips and both the district presidents.

Ontario Hydro Chairman George Gathercole is seen presenting Mr. Hugill with an engraved gavel, symbolic of his office. In his acceptance remarks, Mr. Hugill outlined the history of electric power in the Sault and the benefits of electricity to Ontario's Northland. □

## Here's how . . .

More than 150 representatives from all branches of the electrical and agricultural industries, the federal and provincial governments and financial institutions will attend the Canadian Electrical Manufacturers Association's annual farm tour in the Guelph area next month.

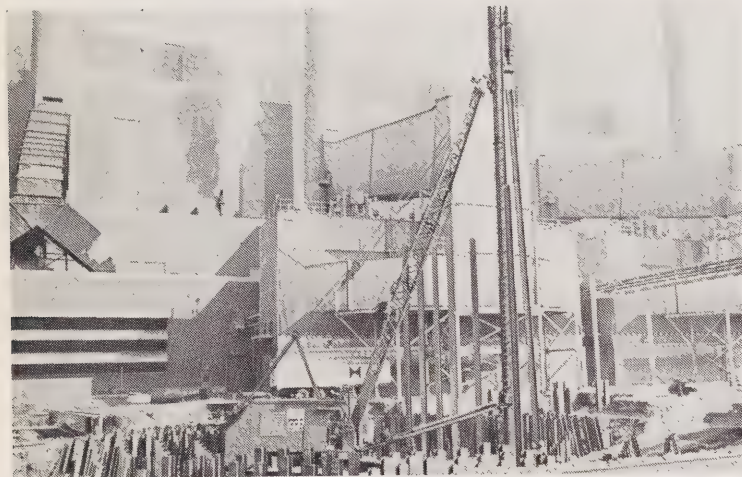
Visitors will tour an agricultural research establishment, a large



cattle breeding operation and two highly specialized, privately operated farms. At each point, operators will demonstrate how electricity is applied to reduce labor and time costs, speed materials handling and raise productivity.

Electrical manufacturers will see at first hand how their products perform under a wide range of conditions including dust, moisture, heat, cold, acid fumes and heavy sustained operation. The tour is organized by CEMA's farm electrification bureau in co-operation with Ontario Hydro.

## Changing skyline



*Start of something big*

The downtown Toronto skyline will be altered within the next six months as the new stack at Ontario Hydro's R. L. Hearn generating station pierces 700 feet into the atmosphere over the lakeshore.

The shell or outer section of the stack is scheduled for completion this fall and the chimney is slated for full operation in October next year. It will reduce ground-level concentrations of sulphur dioxide from the plant by more than 90 per cent.

Building the stack is literally a tall order. Costing more than \$8 million, it will incorporate 8,500 cubic yards of concrete and hundreds of tons of reinforcing steel. Work started early in March on the foundations with the sinking of 361 steel piles, each 60 feet long and with a combined weight of 560 tons. On top of them will go an octagonal concrete pad, 95 feet across and 11 feet thick.

Sinking the piles was an extremely complex manoeuvre. Because the site is near the station's cooling water systems, giant vibrators instead of the usual trip hammers were used to ease rather than drive the piles into place. It was feared the concussion from a pile-driving operation would crack the water system.

Using a slip form operation, it will take two-and-a-half months, working 24 hours a day, seven days a week, to place the concrete required for the shell. Inside the shell will be an insulated steel liner, or flue. Flue gases will be piped from each of the plant's eight units into the 28-foot diameter liner, which runs the height of the shell.

The stack will be 62 feet in diameter at the bottom tapering to 36 feet at the top. During high winds, it's estimated the top section will sway 14 inches off centre.

## Times change

E. Grant Bainbridge, Ontario Hydro's director of consumer service, will be among the speakers at an International Association of Electrical Inspection convention in London, Ont., June 4 to 6.

Mr. Bainbridge will shed some light on the controversial topic

of regional government. Fittingly enough, the theme of the gathering this year is "changing times."

The association attempts to maintain uniform code standard and interpretation and to keep electrical inspectors abreast of new products before they appear on the market.

## Pardon the interruption

The computer has become so sophisticated that power interruptions for as little as a fraction of a second in advanced models can cost the owner thousands of dollars a day on time-sharing applications.

To ensure against lost time on the computer, a Toronto-based firm, Multiple Access General Computer Corporation, has installed an uninterruptible power source designed and built at Canada's General Electric's Peterborough plant.

Called an inverter, the apparatus accepts AC power from the street at 60 cycles per second then rectifies it to DC power. DC power is then inverted to AC power again and fed to the computer at the same 60 cycles per second at which it was received. Should a momentary interruption occur, a battery source cuts in instantaneously to feed the inverter.

The battery system can deliver power for as long as five minutes. As an added precaution, a diesel generator back-up system will feed AC power to the inverter for an indefinite period.

## Splash go the splake

After a long, long time, the trout are returning to Lake Huron. Little doubt, the fishermen will follow shortly.

Fifty thousand wendigo (they're commonly called splake — a hybrid of speckled and lake trout) have been introduced into the lake in a major restocking operation by the Department of Lands and Forests. Another 50,000 are scheduled for introduction later this spring.

The yearlings, ranging in length from three to seven inches, were put into the lake at the outflow channel of Douglas Point nuclear power station.

The splake program is the result of a seven-year study into the possibility of replacing the once-flourishing lake trout, victim of lamprey in the Great Lakes. It is believed that splake will have a better chance of survival against the lamprey since they grow faster than lake trout and spawn in three years against the lake trout's six.

The Douglas Point site was selected for several reasons, but chiefly because most of the Huron shoreline was still icebound while the warm water outflow area was open.



*By the bucketful*



## Fish farms

Fish are tough for the UK's 1,100 trawlers. There's water, water everywhere, but no fish to catch. The same's true around Iceland and Norway, too.

Every year, bigger and more elaborately equipped fleets chase over and fewer fish. As returns diminish, it's being realized that the oceans are no longer the unlimited reserve of food they were long assumed to be. Ideas of breeding fish in captivity and releasing them in their thousands to grow in the sea and repopulate the depleted fisheries have come to naught. The mortality rate of young fish is prohibitively high – 30 per cent of a batch released into the Irish Sea in a pilot scheme a few years ago died in their first month.

But now the idea of restocking the oceans has been replaced by the concept of land-based fish farms. And much of Britain's research has gone into finding the right fish for the job. Apparently, plaice are the answer.

They grow quickly and, being rather placid, burn up little energy swimming around. They will live in captivity at a density well over 1,000 times as high as they do under natural conditions. Plaice, sole and turbot will thrive crowded five to the square foot. In experimental tanks using the warm water effluent from the Calderston nuclear power station, plaice have grown to marketable size within 18 months – half the time it takes in the open sea. Calderston releases 300,000 gallons of water a minute at about 60 degrees Centigrade. Only a small amount of this is passed through the fish tanks where the plaice grow rapidly, stimulated by the warm water and fed at an accelerated rate.

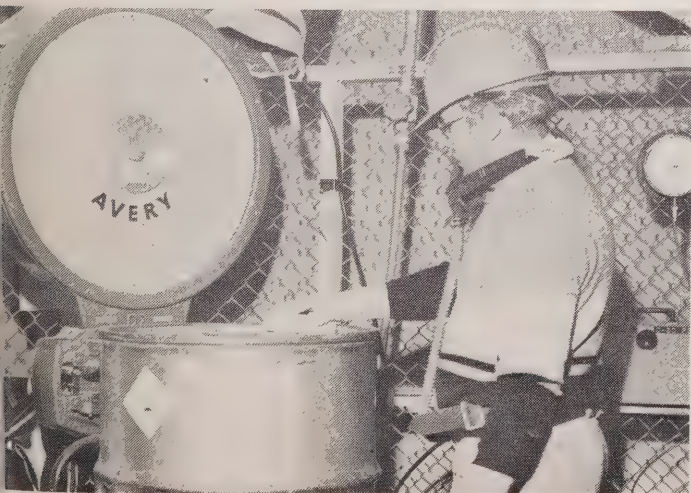
It's estimated there's enough warm water discharged from the station's power stations to raise sufficient fish to supply approximately a quarter of the home market – equivalent to the catch of 250 trawlers.

## Worth its weight in gold

Not quite, but heavy water's still pretty expensive stuff. The "liquid gold" that will be used at Ontario Hydro's Pickering nuclear power station, 20 miles east of downtown Toronto, has just arrived on site and will be stored in tanks until it is required in the plant's reactors.

A workman at Pickering is shown checking one of the 45-ton drums for weight and quality – at \$15,500 a barrel you wouldn't want to get short-changed.

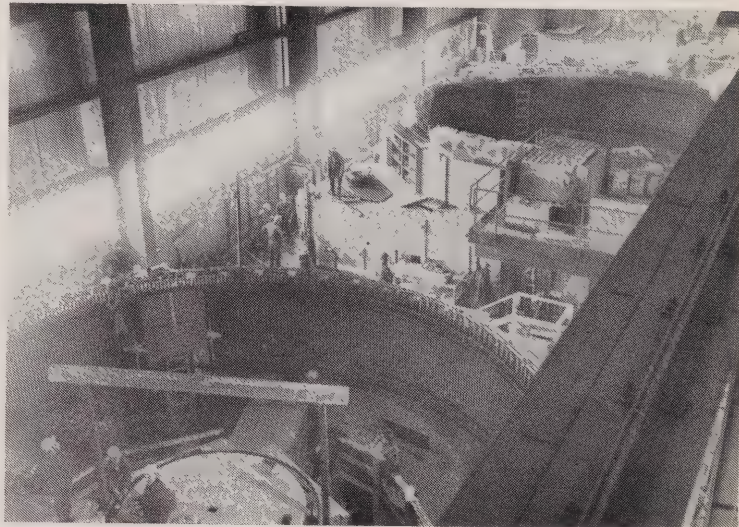
And at Douglas Point nuclear power station on Lake Huron there's little doubt many a tear was shed when they unloaded the 19,000-gallon beer tanks on a warm afternoon only to find they were empty. The tanks were purchased from Canadian



...y enough

Breweries to store low-grade heavy water (.5 to 2 per cent pure). Until they arrived, low-grade water was shipped back to the manufacturer for reprocessing – an extremely expensive routine. But with the Bruce heavy water plant now under construction nearby, it was felt that holding the low-grade variety until the new plant was ready to process it to more than 97 per cent purity would cut costs.

## Wells nears completion



Finishing touches

The thump of a small dynamite charge last month signalled the final stages in the construction of Ontario Hydro's Wells generating station, which will come on the line this summer.

Located in a picturesque setting 20 miles north of Thessalon, the 203,300-kilowatt Wells plant is the fourth to tap the Mississagi River and one of the few remaining hydro-electric sites capable of economic development in the province.

The blast sliced out a section of cofferdam and underlying rock which held the water back temporarily allowing construction crews to work "in the dry" on the intake channel and headworks. The powerhouse has been closed in and concrete floors poured. By using plastic cocoons and heaters, it was possible to place concrete in Northern Ontario's sub-zero weather.

While it's a completely separate plant, Wells will share a head-pond with the existing George W. Rayner station, 900 feet away. The two-unit plant (above) cost approximately \$28.9 million.

## municipal briefs

Havelock Hydro paid glowing tribute to E. J. Leeson, who has been a commissioner for a quarter century. At a testimonial dinner, Mr. Leeson was given a reclining chair although it seems unlikely he'll be using it for a while. Active in municipal politics for 43 years, he's also celebrating his 25th anniversary as reeve of the village and chairman of the park board. In addition, he's been chairman of the community centre for two decades and county warden on two occasions.

Kitchener and Waterloo public utilities commissions have joined forces to fight recommendations in the Fyfe report on regional government that could mean their abolition. Each commission will establish a two-man committee to make an in-depth study



of the report and the ramifications of a possible "twin city" amalgamation. Dr. Stewart Fyfe recommended abolition of the utilities commissions and a return of their functions to council. District and provincial OMEA delegates have been fighting such recommendations.

**Kingston PUC** commissioner and head of the OMEA's power costing committee, Dr. R. H. Hay, has been elected first vice-president of the Ontario Municipal Water Association. Dr. Hay will serve with president N. R. Craig, of Burlington.

**North Bay Hydro** has a prospective buyer waiting to move into its present building as soon as new headquarters are completed. The police department is seeking the building for use by its patrol division.

**For Oshawa PUC** it's spring-cleaning time and crews are busy washing insulators with a high-power water spray machine leased from Ontario Hydro. It's the old story, an ounce of protection is worth a pound of cure — dirty insulation can cause a short circuit that will make a wooden pole burst into flames. □

## Pop goes the bottle

Nuisance disposable pop bottles may soon become a thing of the past.

University of Toronto chemists have devised a method whereby plastics can be made to disintegrate in sunlight, thus promising a solution to the problem of disposing of unsightly plastic containers. Studies by the group, under Dr. James E. Guillet, professor of chemistry, indicate that some plastics show substantial degradation after exposure of less than a month.

Plastics are made of lengthy molecules whose atoms are linked in chains. They are invulnerable to the attacks of micro-organisms, which degrade other materials into their constituent chemicals.

In a seven-year research program, the chemists have found that if groups of atoms sensitive to ultraviolet rays are introduced into the molecular chains during chemical synthesis of the plastics, the chains will break apart when exposed to the sun's radiation.

The plastic then loses its physical strength and becomes brittle and easily broken down by natural erosion from wind and water. The resulting small particles can then become part of the soil in a form susceptible to attack by micro-organisms. □

## Pollution arts

Trent University plans to introduce a credit course on pollution this fall for third and fourth-year undergraduates. It will be one of the few universities in North America offering such a course.

Under the direction of Dr. David Carlisle, head of the biology department, the students will investigate all aspects of pollution, but will focus most attention on water contamination.

The university has been involved in research along the Trent River system for five years. President T. H. B. Symons says the new course will enable this work to be turned to practical advantage. It also reflects the strong concern with which members of the university view pollution, he adds. □

## Foremen's forum

The "boys" get together for a week once every two years. Their objective is to pool, discuss, and evaluate ideas and problems pertaining to the line trade. The boys are Ontario Hydro line foremen and they're brought in, 14 at a time, from all parts of the province to a technical conference sponsored by the training section of Hydro's line maintenance department.

Everyone attending the session is expected to come equipped with a problem to be thrashed out in a group therapy-type dis-



*Put to the test*

cussion. And then there's the "think tank" where small groups are given specific subjects to air as private contractors installing poles in live-line areas, work in bad weather and the foreman himself.

Doug Dukoff, line maintenance training co-ordinator, says a rookie foreman may want to get opinions on everything from how to handle a problem drinker to gaining the co-operation of his subordinates. Older, more experienced foremen may go into long discourse on how things are done in bad weather in the particular region.

"One thing most of the men learn before they leave is the grass is not always greener on the far side of the hill — that other regions have their problems, too," Mr. Dukoff adds.

A highlight of the week away from home is a tour of the Lac Industries plant in Newmarket (above) where the men see hardware they use each day being manufactured and tested.

## speaking of pr

*The public relations activities of the municipal utilities are outlined in this feature by the recording secretary of the joint OMEA-AMEU committee.*

Examples of sound public relations practice are contained in a résumé of the submissions of last year's winners in the OMEA-AMEU Community Relations Award Program. This will be circulated to all utilities in Ontario. Whether the experience of the three winners — Meaford PUC, Oakville PUC, and Etobicoke Hydro — can be directly applied to other municipal hydro systems is debatable. Nevertheless, the various techniques which were successful should be familiar to all utility officials. "Tell the People" remains a central theme on the value and contribution of a hydro system to its community and its customers.

\* \* \*

Back in 1968, this column promised to report on the efforts of municipal electrical utilities across the province were making to improve communications with the public. Since that time more than 50 individual efforts have been described and discussed.

Just as public attitudes and interests adjust over a period of time, so too must communications techniques. This column will continue to provide coverage of utility PR activities, but will not appear as regularly as in the past. It is likely that other techniques such as the circulation of pertinent material will be used to report the activities and achievements of hydro utilities as more and more of them adopt their own programs.





## As don wright sees it

side from the façade which can be created with the shrewd use of the pipe, the non-committal smile and the expensive but conservative suit, the personnel man has a lot going for him as may be gathered from the intriguing tidbits picked up by the press at the recent spring conference of the Personnel Association of Toronto.

Predictably, employee motivation came in for a share of attention and any oaf who considers this esoteric science as just a sneaky way of getting the most work from an employee at the least cost to the corporate coffers needs to get with it.

As one of the speakers at the convention pointed out, some aspects of a job can lead to dissatisfaction and others to satisfaction and high performance. But if you think it's all as simple as it sounds, listen to this:

"The trick is that the causes of dissatisfaction bear no relation to the causes of satisfaction. Thus, if an employer removes the cause of an employee's dissatisfaction, he does not obtain a satisfied employee, but only one who is no longer dissatisfied."

Like we suggested, the life of a personnel man is not all tweed and tobacco. He loves to pick the roses and the thorns in the broad field separating the dissatisfied employee from the non-dissatisfied employee and is trained to look down his nose at money as an effective source of motivation for any other fellow.

"Money," one of these gentlemen remarked at the Toronto sessions, "is like all rewards — if the appetite for it is satiated, it has the weakest incentive value of all."

As with so many of these conditional phrases, the little word "if" looms big. It has been our observation that the human appetite for money can properly be described as voracious and we suspect that acute monetary satiety is among the world's rarest maladies.

Nonetheless, the personnel people were told at the convention that management will have to discover motivators — "they will have to begin to examine jobs for the amount of psychological rewards they provide and, where this is found wanting, to restructure them."

This may be sound thinking where the younger generation is concerned and it's worth a try. Hardened veterans of the work force will probably continue to find all the motivation they need in the crisp crackle of old-fashioned greenbacks and

the warm feel of cold cash. Psychological income, on the other hand, is non-taxable.

And let them gather their lettuce while they may. Another speaker told the convention that every company should fire half of all their older workers in the interest of efficiency and give the boot to a slightly smaller percentage of the rest. He reported that at least five major US corporations are gleefully firing half of their employees over the age of 55 to make way for younger blood at the executive level.

At one point in his remarks he did show some concern lest some ding-aling in the audience consider the process callous. "What you can't do is let it get you here," he said, patting his mid-section. "It sounds harsh but you'll get ulcers and that's no good."

How do you suppose the personnel men reacted to this headline builder? With catcalls and clenched fists? According to one newspaper account: "The address ended to loud applause and a good part of the audience came forward to congratulate him personally."

In their enthusiasm, apparently, no one stopped long enough to consider what might be in store for the personnel man grown long in the tooth.

Turning to a more benign group, we find the public relations people exhibiting some concern over their professional status. In a move to elevate the calibre of practitioners, the Canadian Public Relations Society has set up an accreditation course for members.

All well and good, but it's difficult to follow the reasoning of one successful graduate who takes exception to the fact that "women on the shady side of entertainment have been calling themselves PRs. So have some salesmen."

We can understand him taking exception to the salesmen, but the logic eludes us with regard to the world's oldest profession. Ladies of the night, it seems to us, have been carrying on relations with the public in the most literal sense since the dawn of history.

Another intriguing item recently brought to our attention involves one of our own public relations men who recently held forth on that subject at a convention of cemetery operators in Stratford. Sounds like a real challenge. Only the most skillful public relations program is likely to elicit much response from cemetery customers.

On the labor front, we were surprised to learn that millions of Americans still work 49 hours a week and more. These are the down-trodden, backward and non-unionized factions of American society such as the professional, managerial and entrepreneurial types — not "working men."

Consider the lot of Britain's construction workers. According to a recent country-wide survey these poor chaps are losing 45 minutes out of every working hour in order to accommodate such practices as smoke breaks, prolonged lunch hours, extra tea breaks, over-staffing and on-the-job chatting.

How long they will be able to maintain that 15-minute work break is anybody's guess, but if the trend continues it could solve the country's vexing labor problems. What's the point in going on strike against chit-chat and tea parties?

Ever on the alert for anything even remotely suggestive of discrimination on the basis of age, color, sex and what have you, we are inclined to view current union demands against Hydro for

maternity leave with a great deal of suspicion. As we understand it, this benefit would apply only to females. Inasmuch as pregnancy is almost invariably a bilateral arrangement, it seems to us that both parties should be entitled to share any accruing benefits.

A fine point, perhaps, but management should explore every possible loophole to avoid this kind of favoritism — even to invoking the terms of the preventable disease act. Otherwise, labor pains are inevitable.

Inflation seems to be slackening off a bit and, if it is, we all owe a debt of thanks to the intrepid lads on Parliament Hill. The leadership they have been providing is indeed reassuring and some of their anti-inflationary legislation is truly inspirational.

An example is that bit governing their own pensions. Under the new scheme, MPs with eight years' service are entitled to draw \$5,000 a year for life. For some, this makes retirement possible at the ripe old age of 35 or even earlier.

Indignant howls from the uninformed suggested that greed was behind the move, but the boys were just being realistic. Physically, we all begin to deteriorate after the age of 21 but most occupations do not demand top conditions. With politicians it's a serious matter once the wind begins to go.

In any event, the Ottawa MPs had already done their duty with regard to inflation a few months earlier when they managed to hold the line on old-age pensions — allowing them to rise only from \$78 to \$79.58 a month.

Pollution remains on everyone's tongue, in a manner of speaking, but things are worse than we thought in Lake Erie. As quoted in the Windsor Star, one US professor said he could name "a myriad of contributing problems to Lake Erie pollution." Those cited included toxic wastes, thermal pollution, careless agricultural practices and "erotic species." With regard to the latter, he pointed the finger specifically at the Japanese snail and the Chinese mitten crab.

According to Webster, the word "erotic" means devoted to, or tending to arouse, sexual desire. We really do have a problem if undesirable orientals such as these are on the loose corrupting the morals of Lake Erie denizens.

We also read an account of a mercury pollution test of Lake St. Clair water which showed .008 parts of mercury per million parts of water. This was described as "about half the amount you can put on the head of a pin in a quart of water."

Not very much, we suspect, since mercury is a pretty slippery customer and difficult enough to stack on the head of a dry pin.

Last item on this month's agenda involves the development of an all-electric rocket. Scientists at the California Institute of Technology describe electric rockets as "the ultimate form of space propulsion." They forecast speedy five-year trips at 79,200 miles an hour to place the electric ship in orbit around Neptune.

To the best of our knowledge, contracts have not yet been let for the extension cords. □



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## power hunger

Ontarians have a king-sized appetite for electric power. To help relieve the hunger pains, Ontario Hydro is conducting an unprecedented generation construction program costing about \$2.5 billion. Lower Notch generating station will be the fourth hydro-electric plant to tap the Montreal River's power potential. However, two small stations will be flooded out when this one comes into service next year.



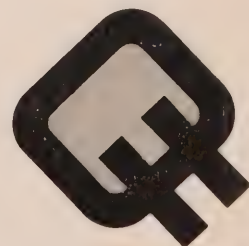
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- men of clay
- heyday of the banana split
- DC comes on strong

## ontario hydro news

june/1970





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### the cover

With all the skill and patience of his craft, an employee at Ontario's Blue Mountain Pottery fits spout into teapot. More about the success story of this post-war venture on page nine.

### editorial board

George E. Gathercole, Chairman, Ontario Hydro  
D. J. Gordon, General Manager  
D. G. Hugill, President, OMEA  
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## Viewpoint

# shades of grey

A classic example of the damned if you do or damned if you don't conundrum faces Hydro in the choice of new generating stations. With the rivers of the province incapable of contributing significant additional generating capacity, Hydro must go thermal. To meet power requirements which are doubling every decade, it must utilize fossil fuel or uranium. It is doing both on a large scale, but not everyone is happy.

Some say the present nuclear commitment is too large and too risky. One critic asked why, in the face of technological uncertainties and the high cost of money, Hydro should "lead the world" in a nuclear program.

Others take the opposite view.

Opinions run the gamut from all to nothing at all where nuclear power is concerned. Neither approach is acceptable.

There is no doubt that nuclear facilities are more desirable. If Hydro could select either type of plant from the shelf, each bearing a life-time guarantee of performance and with identical price tags, the nuclear package would most certainly get the nod.

Consider its virtues. The nuclear plant is assured of an abundant supply of low-cost fuel mined and manufactured right here in Ontario. It is more pleasing aesthetically and operates at virtually no cost to the environment.

Unfortunately, there are a number of sound reasons why Hydro cannot go fully nuclear at this point in time. People who see the question in terms of black and white are suffering from visionary deficiencies occasioned by a lack of knowledge of the full situation. There are many shades of grey.

Lack of experience is one factor mitigating against a nuclear "one basket" approach to new generation. Critical in-service schedules necessary to meet soaring power demands provide little leeway to iron out teething problems associated with a prototype technology.

Delays in the delivery of components and unsatisfactory performance resulting in missed production targets are immensely expensive. It has been estimated that if one of the 750 megawatt units at the Bruce nuclear station is late, out-of-pocket expenses would amount to a minimum of a million dollars a month.

The Canadian nuclear industry is not sufficiently developed to cope with an expansion program of the size which would be thrust upon it if Hydro were to go all-nuclear at this stage.

Financial considerations add to the uncertainties. For the same capital outlay, Hydro can build conventional thermal-electric stations with twice the capacity of nuclear plants. Subsequent operating expenses will favor the nuclear installation, but raising vast sums of capital on a highly competitive market is a serious problem. High interest rates naturally reflect to the disadvantage of capital intensive nuclear developments.

Ontario needs nuclear power and it must be introduced at a speed which, all factors considered, is in the best interest of the people of this province. It calls for an expert touch on the nuclear throttle. In this context the penalties for careless driving or obstructing traffic can be very costly. □



# Remember those sundaes on a Saturday night?



by Susan Goldenberg

Today, pleasure and happiness are often sought in far-away places, but yesterday they were just around the corner.

They were the top drawing card of the ice cream parlors of the early 1900s, still remembered by many people with fond nostalgia. Ice cream parlors had high elaborate ceilings, mosaic tiled floors, heavy chandeliers and wood-panelled walls adorned with paintings of hunting scenes, ships and horses or photographs of athletes.

Gorgeously-wrapped boxes of chocolates, at 35 cents a pound, seven-foot-long Christmas candy canes, three-foot-high chocolate Easter bunnies and loose candies in tall, glass containers were displayed in the windows.

The soda fountain was a solid masterpiece of white marble with intermittent black panels. Stickers extolling the virtues of various products were pasted on large

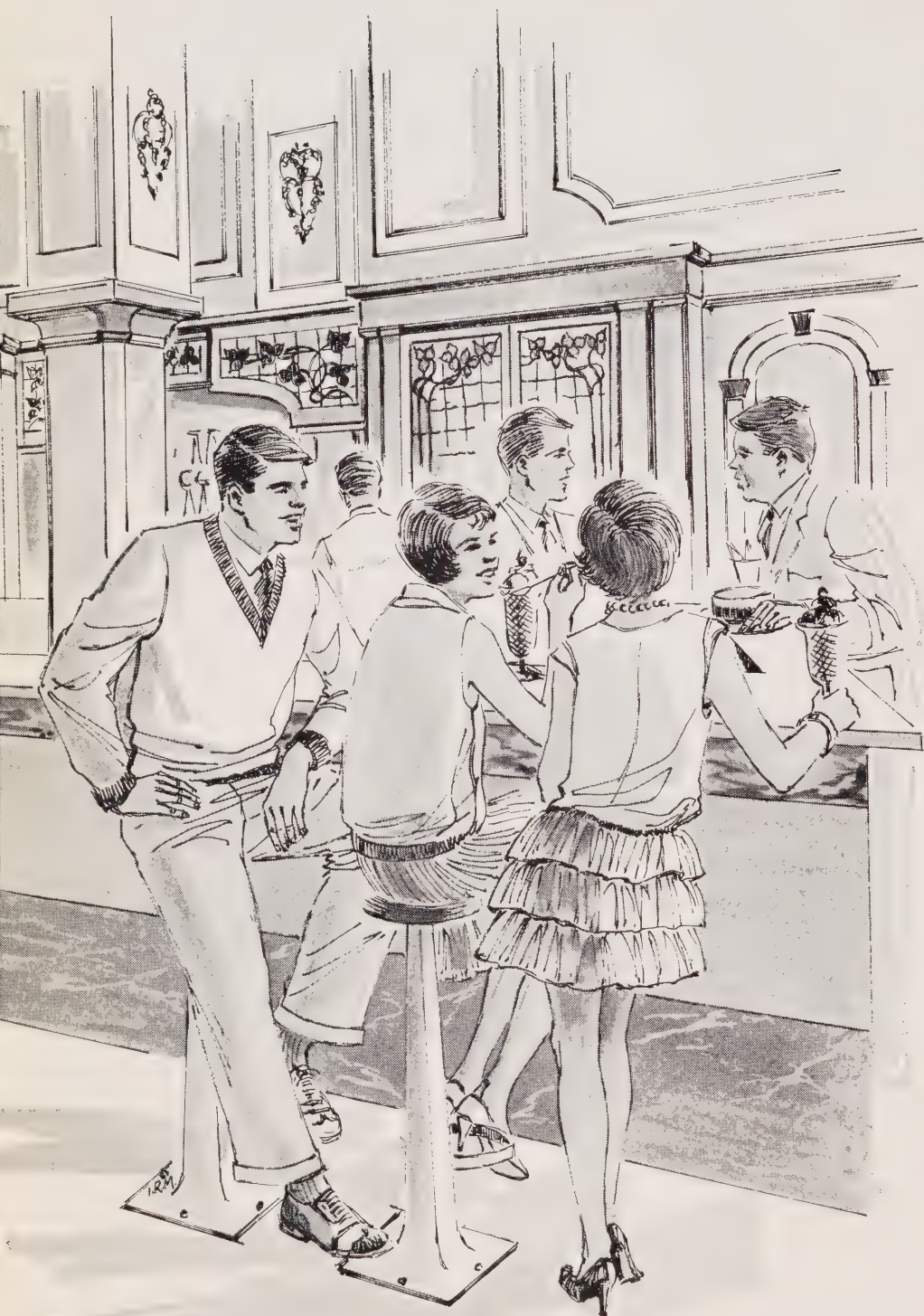
mirrors behind it. At the back was a collection of inexpensive tables with twisted wire legs and wire-backed chairs.

During its short heyday between the turn of the century and the depression, the ice cream parlor played a special role in urban and rural communities in North America. It gave people sparkle and zest in a time when life was less rushed and complicated and enjoyment could be found in simpler things than today.

Although they seem a symbol of lost innocence compared to today's swinging singles bars, ice cream parlors actually reigned in an age which put the death seal on the Victorian era — an age of gangsters like Al Capone, the flapper and a new, uninhibited music called jazz.

The tapestry of much of the social and courting life was woven in ice cream parlors. An outing at one was always a special occasion. Little girls wore their





fussiest organdy party dresses while the big sisters would be in flapper-style dresses and cloche hats and their mothers in elegant silk dresses. Young blades like former Metro Chairman Frederick Gardiner and ex-Mayor Nathan Phillips sported sharply pressed trousers and straw boaters and saved up to take their dates there. Customers flocked to the parlors, first in horse-drawn buggies and later by streetcar or in early model cars.

Toronto, as the focal point of Ontario, boasted dozens of top-notch ice cream parlors. "In the early days, many of them were located along the Humber River and the younger generation would visit them after renting a canoe and paddling up the river for an afternoon's outing," Mr. Gardiner recalls.

Later, toward the end of World War I and throughout the twenties, the ice cream parlor community was concentrated along Yonge St.

Many ice cream parlors made their own supplies either on the premises or in a factory nearby. In the early days, the cream was churned out with a hand-cranked freezer and preserved in rock salt and crushed ice.

Electric freezers revolutionized the business but lucrative mass-production methods didn't arrive until the peak of the ice cream parlor craze in the 1920s when the still-used continuous process freezer was developed.

In this, the ice cream is pumped through a long slender double-walled tube. A refrigerant is expanded inside the wall, keeping them Arctic cold, and the mixture freezes as soon as it strikes the wall. The whole process takes only a few seconds after which the ice cream is sent to a hardening room.

Today, a few fruits, nuts and candies may be added at the freezing stage, but the glorious era of the ice cream parlor, when each establishment had its own distinctive flavor. Only the best ingredients were used, including twice the amount of butterfat than today and pure rather than synthetic flavoring. Servings were giant sized at a quarter of today's prices and decorated with nuts, whipped cream, syrups and freshly-cut fruit making each sundae an object of awe.

"In the large parlors, it was not unusual



see a stock of bananas hanging at the  
t for banana splits," recalls Harry  
McMillan, who was just starting his  
ing career for Neilson's chocolates at  
time. "A large punchbowl also  
filled with fresh eggs for whipping  
with milk and ice cream for egg-nogs."

forerunner of Toronto's ice cream  
ors was started by a young widow with  
children as she strove to improve the  
ily baking business. The superlative  
cess of the soda fountain opened in the  
0s by Mary Farrow Coles in the shop  
nded by her father-in-law, George  
es, in the outskirts of Toronto quickly  
ght on.

George Coles had learned baking in  
land and, on his arrival in Toronto in  
7, he opened a bakery on the ground  
r of his home in the Bloor and Yonge  
community. Coles branched out as  
ada's first catering business and  
hed the peak of its fame under George's  
ndson, Walter, who was a child  
digy on the piano.

kept a piano in a studio on the  
nises and would often disappear in  
e for two to three hours," his niece,  
Betty Eastman, recalls.

wealthiest people in the city, who  
lived on Jarvis, Bloor, St. George,  
en's Park Crescent and later, as the city  
y, in Rosedale and Parkdale, always  
opped at Coles. "Customers often  
e in their carriage driven by a coach-  
and the women always wore white  
gloves," Mrs. Eastman says.

s was perhaps most famous for its  
anting cakes, many of which Walter  
s designed. Marzipan candy was  
ed around cake moulds to form  
s, melons, cabbages or footballs.  
es in Northern Ontario's mining towns  
sidered it a "must" to have a Coles  
ding cake.

944, three years before its centennial,  
ge Coles and its 12 branch stores  
t out of business. But even during its  
ay it had shared its pedestal with  
other Toronto ice cream parlors —  
Palm Gardens and Tea Rooms,  
r known as Bingham's after its  
der and owner, Huyler's and Diana  
ets.

Bingham's was the Cadillac, mink coat  
and 25-carat diamond of the city's ice  
cream parlor business. George A. Bingham,  
an affable, astute businessman who  
sporting a Teddy Roosevelt moustache,  
was born in Bradford, Ont., in 1862 and  
became a member of the Toronto élite.

In 1899, he opened a drug store at  
100 Yonge, near Richmond. "Three  
years later, he introduced an ice cream  
parlor as a form of advertising to bring in  
people to buy drugs," recalls pharmacist  
Charles Whebbly who, as a young man, used  
to discuss the drug business with Bingham.

Bingham's elegant reputation was largely  
due to its live palm plants and a stair-  
way at either side at the back of the store  
leading up to a balcony where people  
could sit. In the evenings, music was  
supplied by records featuring top soloists  
of the day like Enrico Caruso and John  
McCormack.

"After Bingham's disappeared, Huyler's  
on Yonge north of Albert became the  
fashionable place to go," Mr. Phillips  
recalls. Huyler's, a branch of an American  
chain, was especially noted for its pastel-  
colored, candy-coated almonds and French  
chocolate ice cream.

Diana Sweets outlived its competitors  
by evolving from an ice cream parlor to a  
tea room and, finally, to a restaurant  
which serves liquor as well as food.  
Diana's is the story of the poor boys  
who made good. It was founded nearly  
60 years ago in 1912 by Gus, Charlie  
and Jim Boukydis — sons of a Greek  
shepherd. They had started off in the New  
World by peddling fruit.

Diana's owed a lot of its success to loyal  
staff members like Rosino Samarrillo, now  
one of Toronto's best-known waitresses,  
who footed many customers' bills during  
the depression. It was also blessed in  
having a rapid-fire "soda jerk," Louis  
Londos, who often made up to 600 sundaes  
an hour. Londos designed his own  
sundaes, naming them after movie stars,  
distinguished city guests, war heroes,  
airplanes, the seasons of the year and  
special events at the university.

During the depression, the back part of  
Diana's downtown store, still located at  
Yonge and Queen, was used as a dance  
floor to draw in customers. But the Bloor  
and Avenue Road store, torn down in  
1958 for the Bloor subway, "prospered so  
much I wasn't aware there was a de-  
pression," Gus' son, George, recalls.  
Police were necessary to control the  
crowds, which lined up at the store each  
weekend.

As the ice cream parlor faded away, it  
was replaced by soda fountains in hotel  
lobbies as well as in drug and department  
stores. Eaton's got cream for its ice  
cream from 20 cows on a farm in Islington  
purchased by Timothy Eaton while drug  
stores like Strong and McIlraith's at  
Bloor and Yonge had to stay open 24  
hours a day seven days a week because of  
their popularity.

Eventually, however, these also disappeared  
and the onslaught of other specialty  
restaurants like the hot dog stand relegated  
the ice cream parlor to the nostalgic  
corner already occupied by the nickel  
cigar and the penny chocolate bar. □





Ontario Hydro's general manager Dr. J. M. Hambley retired last month after a 40-year career. He is succeeded by Douglas James Gordon. In these interviews, both men discuss the electric power industry in Ontario, past and future.

## time to relax after 40 years

His chair was tilted slightly back, his blue serge suit jacket was unbuttoned, but his matching waistcoat wasn't. Dr. J. M. Hambley sat relaxed and smiling. And he reminisced.

Ontario Hydro's retiring general manager looked back over a career that has spanned 40 years — the last decade at the helm of one of the world's largest electrical utilities.

Oddly enough, when Dr. Hambley began his Hydro career the country was deep in the depression. And now, as he ends it, the nation is involved in yet another

economic battle — the fight against inflation.

Typical of the man that he is, Dr. Hambley refuses to take credit for Ontario Hydro's progress over the last 40 years.

"Sure," he says, "we've come a long way in the last decade. But the accomplishments aren't mine — they're the accomplishments of a team of highly-skilled professional people doing a competent job to bring each new venture to fruition. That's the way Hydro's always been.

"The way I see it, my role as general manager has been simply to maintain a practical climate in which people can work effectively."

The retiring general manager is obviously a "people man." He always has been. For example, ask him about some job and he'll say: "Oh yes, Gordon Pace was the boss there" or "Cliff Ferguson was the Georgian Bay man on that."

When he began his Hydro career in 1930, armed with a degree in electrical engineering from Queen's University "and a little more interest in the administrative side of things than in design engineering," Dr. Hambley had no inkling of the vast expansion program that lay ahead.

"You have to remember this was in the depression period and very few of us thought too much about the future. We were all concerned with the here and now — thankful that we were able to earn our bread and butter at a time when many were less fortunate.

"It's a funny thing, you know, but back in the depression most of the industrial activity was in the north. Gold was a pretty important commodity and they used to say the north carried the rest of Canada. Anyway, the north was my country — I'm from Copper Cliff — and I was very fortunate to be involved in northern development.

"We started out with several small isolated systems, then acquired the Northern Ontario Power Company. It was part of my job to supervise its integration into Hydro's system — but there really wasn't any problem. We had taken over Abitibi Canyon from a private power company in the early thirties. Its only outlet for power at the time was the International Nickel Company, but we gradually built up other loads, too. It was fascinating to watch

them being melded together into one system."

Maintenance was a far different job in those days. "We had a network of patrolmen, then, with an army of patrolmen keeping an eye on 20 to 40-mile stretches of line. Communication was by telephone circuits strung along the lines. Dogs were pretty common on patrol. In some areas horses replaced the dogs, then came trucks when the roads improved and now we've got helicopters. Today, a guy sits and concentrates his full attention on watching the line — like he's being paid to do — rather than keeping his eyes on the ground to prevent himself from tripping."

Over the years, Dr. Hambley has seen automation bring about countless changes and many economies. "Sure, some jobs were eliminated but the general rate of expansion always took care of those who were displaced."

In the early days, an operator was paid about \$90 a month. "Now we pay the little girls running around with the mail \$90 a week. Yet the cost of a kilowatt-hour today is about the same as it was back then, or only marginally higher — it's a rare phenomenon indeed."

And methods of generating power — well, Dr. Hambley started, the peak was 818,710 kilowatts as compared to more than 10 million kilowatts in 1969 — have changed drastically from a completely hydro-electric system to a mixture of hydro-electric and coal-fired stations to nuclear plants. Indeed, he feels the nuclear program will be the solution to most of Hydro's problems. "I suppose that's one of my biggest desires now — to see the nuclear program develop satisfactorily," he says.

Dr. Hambley remembers with pleasure the formation of the Employees' Association — forerunner of the Ontario Hydro Employees' Union. He says there were "many inequities" within the old autocratic systems and he knew at the time that the association would clear them up.

There have been bad times with the govt. over his 40-year career. The 1969 OHI strike left a shadow. "It was worrisome from many angles . . . the conflict, the conditions that developed through no one's fault that made the confrontation necessary."

Then there was the 1965 blackout — "embarrassing, naturally, for us. But the major problem was really the inadequacy of the systems in the south to cope with such an emergency.

"But, in the long run, much good has come of it. There was always a general awareness of the importance of our interconnected systems, but this major



Dr. J. M. Hambley



emergency brought that awareness into the delight and forced the installation of more sophisticated and adequate equipment."

and that's typical of the man who steps down after a 40-year career with Ontario Hydro — seeing much good, even in the bad. □

## Big problem is to overcome doubt

needs a realist and an optimist to take the responsibility for the day-to-day running of a \$4 billion enterprise which is passing through one of the most critical periods in its history.

ppily, Douglas James Gordon is both. He's certainly under no delusions about his work. But at a time when clouds of gloom pervade the electrical industry throughout the world, he can still see the silver lining.

One of our main problems in the next decade will be overcoming doubts within

the industry itself that electrical utilities will be able to cope with the future," says Mr. Gordon, newly appointed general manager of Ontario Hydro.

It's the realist speaking when he recognizes the magnitude and complexity of expansion programs facing electrical utilities in most industrial societies. This must be done at a time when money is scarce and environmental concerns loom large in the mind of society.

Yet the optimist sees that the future holds opportunities as well as problems and challenges. "Let's not forget that we have the opportunity to provide a service which is so vital to the economic growth and well-being of the province and the opportunity to improve the standard of living and the way of life of the individual," says Mr. Gordon.

He points out that there have been difficult times in the past, and the organization has been more than adequate to meet them.

"In the decade in which I joined Ontario Hydro, starting in 1945, we were faced with brownouts, the need to more than double our capacity, we went through a major reorganization and decentralization, we raised our rates for the first time in many years and, just to keep ourselves occupied, we embarked on one of the largest frequency standardization jobs ever undertaken."

Doug Gordon is a representative of that breed of highly articulate engineers who have proven their administrative abilities by filling some of industry's top posts. He was born in Brockville, attended school in Kingston and graduated from Queen's as an electrical engineer in 1943. He joined Hydro's municipal department two years later after a stint as a lieutenant in the Royal Canadian Navy.

He successively became municipal service engineer, manager and then director of the consumer service division, executive director — marketing, and assistant general manager — marketing. Earlier this year he was appointed deputy general manager and now, at the age of 50, steps in as Hydro's general manager.

His career was interrupted for only 11 months while he attended the National Defence College at Kingston on a course for senior members of the government, the armed forces and business.

"The course was a study or assessment of the world's economic, social, political and military conditions and problems," he says. "The highlight was a two-month tour of the Middle East and India when we had the opportunity to meet and talk to some top political figures, including Mr. Nehru."

Undoubtedly, one of Mr. Gordon's big jobs in the years ahead will be to help plan sufficient generating capacity for Ontario's expanding economy while having the least impact on the environment. He stresses Hydro's readiness to introduce environmental controls, but shows concern lest the provincial utility be forced to spend millions of dollars on unworkable and ill-considered equipment.

"It is obvious that society will continue to demand that the utilities 'clean up' and this will involve very substantial expenditures on anti-pollution measures," he says. "This will be reflected in higher wholesale costs to the municipal utilities and, in turn, higher retail rates to each customer in the province."

"Considering the cost of electricity in relation to the trend in costs for other products and services, I think the average customer is prepared to pay in order to improve his environment. Even so, rate increases to meet this expense on top of the rising trend in rates from inflation could result in a cut-back in expansion plans for some power-cost-sensitive industries in Ontario. Some of these companies are also caught in the pollution and inflationary squeeze and power rates could be the straw that breaks the camel's back."

Mr. Gordon doesn't view the trend toward regional government with alarm. "The concept of Hydro in Ontario has built-in flexibility and can be adapted to fit the various forms of regional government which will emerge across the province," he says.

"It's axiomatic that regional government will mean fewer municipal utilities, but they should be larger, self-sufficient, more viable units with complete responsibility for their day-to-day operations."

"Obviously, regional government will also have an effect upon Ontario Hydro's rural distribution system," he adds. "In some cases, we'll be losing portions of our rural system to a municipal utility. In other areas, the reverse will undoubtedly take place — that is, Ontario Hydro will take over some smaller and medium-sized utilities and become the major retailer in that particular region."

Above all, Doug Gordon is customer and marketing oriented.

"It's so easy and natural for a power generating authority such as Ontario Hydro to fall into the production-oriented trap," he says. "Ontario Hydro and the municipal utilities have over two million customers at the ends of those lines and let's never forget that they are the reason for our being in business." □



D. J. Gordon



There was a time when if a kid said "ain't" to the school m'arm, she'd reply: "Ain't ain't in the dictionary." Well, all that's changed now.

Ain't is there all right, but Compec, a word meaning overwhelming success, still hasn't made Funk and Wagnalls.

Originally spelled COMPEC, it stood for Co-operative Marketing Plan for Essex County. The EC was later altered to mean electric commissions so that Compec could be used anywhere in the province — a sort of gift from the 12 small municipal utilities in the county (Windsor is excluded).

And it's catching on. Now there's Compec Bowmanville, Compec Lambton and Compec Norfolk — and a host of others considering formation of their own group.

Although it's not clear who coined the word, Leamington PUC manager Jack Anderson is probably the key man in its formation. Back in 1966, Mr. Anderson could see the competition getting rough — the gas company's office is next door to his own — and approached Ontario Hydro's western Region for sales assistance on a part-time basis. Plenty of water heating, cooking and home heating load was being lost to the competitor and his argument was that smaller utilities could not afford a sales staff of their own — and the manager didn't have sufficient time to devote to an all-out load-building program.

Then, armed with resolutions indicating interest in sales assistance, all 12 utilities in the county sought help from Ontario Hydro. They arranged to pay a set sum per customer per year to offset salaries and expenses, and Ontario Hydro agreed to increase its Essex area sales force. Compec was born.

There was a formation dinner in Leamington April 17, 1967, and not a single commissioner or manager in Essex County was absent. Represented were Amherstburg, Belle River, Comber, Cottam, Essex (town), Harrow, Kingsville, Leamington, St. Clair Beach, Sandwich West, Tecumseh and Wheatley.

Ontario Hydro's Essex area is the 13th member and from here Compec's staff of four sales representatives and two sales clerks worked under the guidance and supervision of Al Steels, at that time the area's sales and service supervisor.

Mr. Steels, now sales superintendent for Ontario Hydro's Western region, says that before the group's formation there was only limited selling in the small utilities — there just wasn't the sales force available.

But all that's different now.

In Compec country they're leading the rest of the province two-to-one in all-electric home sales. Last year they captured 36 per cent of the new home market.



# compec

put this in your Funk and Wagnalls







And they're keeping the people down that way in hot water, too. In 1969 they managed to install 1,162 Cascade water heaters deep in the heart of natural gas country.

Mr. Steels says the salesmen are giving the competition a run for its money. Take, for instance, the builder in Stoney Point — that's on Lake St. Clair — whose plans call for 28 new homes this year. The Compec crew has managed to get 24 of them all-electric. "Not a bad batting average, eh?"

Says Jack Anderson: "It's great to be able to tell a customer we'll have our salesman call. Before Compec, the utilities just didn't have the time to devote to marketing and the competition was walking all over us."

But, he adds, there's a lot more to Compec than sales. Like uniformity. The 12 municipal utilities and Essex area have adopted a standard 27.6 kv distribution system for all new construction. They have a uniform water heating policy, a uniform approach to underground distribution and are currently working on a standard approach to the collection of arrears.

Now the group's going in for bulk purchasing — it saves a bundle. There's an endless string to what Compec's doing and it's these "fringe benefits" which impress Mr. Anderson most.

Matter of fact, he calls Compec the utilities' answer to regional government. "If regional government comes to Essex County, we're ready for it. Compec's really a form of regional government now. It's a co-operative venture to gain the advantages of a regional setup without losing local autonomy. We still have our local commissioners, who have the ability to react faster to local problems, and we can turn to the others for help. We're not taking away the participatory democracy concept.

'And you can bet that if the time ever comes that regional government is in the offing for Essex County, Compec will be in the very forefront," he adds.

Mr. Anderson never misses a Compec meeting — advisory board or general. He

says he couldn't afford to — there's too much excitement. "Every time we get together we realize there's something else we can standardize and now it's even spilling over into the supply of water.

"Compec," says Mr. Anderson, who manages the largest utility within the group, "adds a real sparkle, or challenge, to the utility manager's job." And John Middel, who manages Harrow Hydro, the smallest utility in the group with a full-time manager, figures Compec was about 15 years too late. Pretty sales oriented himself, Mr. Middel feels all Compec utilities don't get the benefit of a salesman 52 weeks a year, but they don't need a full-time service.

"It's the fringe benefits that make Compec worth the price of admission," he says. "Our ability to standardize throughout an entire county where there's an even blend of urban and rural load is really something. We really learn how we differ at those meetings, and we sure have some rousing ones. But we always part as friends."

Mr. Middel's sales orientation takes him a step further than all-electric living. He's president of the Harrow Chamber of Commerce and in that capacity is trying to sell the community to industry. Of course, he says with a smile, selling Harrow is selling electricity — and he "sure does" take advantage of his Compec affiliation to help in this regard.

Speaking about regional government, Mr. Middel says it would be "just the thing" for Essex County. "And the provincial fathers could tell the regional leaders to get together and do exactly what Compec is doing, make things fit the way the utilities are doing, and provide the same type of service for everyone — if Compec can do it, so can regional administration."

That, Mr. Funk and Mr. Wagnall — wherever you are — is Compec. □



# Canada on the mantelpiece

by Rae Hopkins • photos by Gary Smith





It all began in an old barn.

Now Blue Mountain Pottery is known around the world.

*Blue Mountain Pottery originates in this studio on the western outskirts of Collingwood.*



In Hong Kong, in Australia, the US, Bermuda, Trinidad, Switzerland, and even in Japan, there's a little piece of Canada.

And shipping Canadian-made pottery to England, one of the world's fine china capitals, is something like carrying coals to Newcastle. But Collingwood's Blue Mountain Pottery is doing it with a great deal of success.

It was back in 1949 that a handful of craftsmen, with the know-how of Canada and Europe at their skilled fingertips, quietly pooled their resources under the brow of a ski slope facing Georgian Bay to give birth to the booming pottery industry.

They started out in an old barn at Craighleith and found the raw materials they needed no

further away than their doorstep. Where a pioneer farmer of Upper Canada once bedded down his livestock, the potters mined rich red clay to mould into long, tapered salad dishes, sunfish-shaped ash-trays and graceful, long-necked vases reminiscent of central Europe.

Today, the potters still mine clay from the Blue Mountain and from the depths of Georgian Bay, but the requirement has shot up to about 1,000 tons a year to keep abreast of the 750,000 pieces of Blue Mountain Pottery the world-wide market demands annually.

The enterprise, which now employs 120 craftsmen and has a payroll close to half-a-million dollars, owes its success to Jozo Weider, affectionately known as the "father of skiing in Canada."

When he came to Canada from his native Czechoslovakia, Mr. Weider had no set plan to launch a handicraft industry — he was too busy building the Blue Mountain

ski resort, which has become one of the best known in North America. But after being joined by two fellow countrymen, he realized they had between them the nucleus of a fine craft in their adopted land.

In the summer of 1955 they opened a roadside shop on the highway leading to some of the finest fishing and playground areas in the province. Collingwood Chamber of Commerce, proud of its new industry, climbed on the bandwagon and started displaying pottery pieces in its windows, and persuaded Ontario shopkeepers to do the same.

It wasn't long before a flood of orders for the green and blue-green pottery necessitated the buying of bigger premises. In the new locale, the potters and the Weider family continued their work and the customers continued their demand. The new plant, like its predecessor, soon became too small and a 10,000-square-foot building was erected on the outskirts of Collingwood.

However, there still was no hope of shutting down the older pottery. Orders kept piling up — so much so that the potters experienced difficulty in meeting demands with two plants operating at full capacity.

Mr. Weider bought yet another plant in Collingwood and even now the two large potteries are taxed to the limit to produce sufficient giftware to satisfy the appetites of world-wide collectors, says Alfred Dul, who four years ago became general manager.

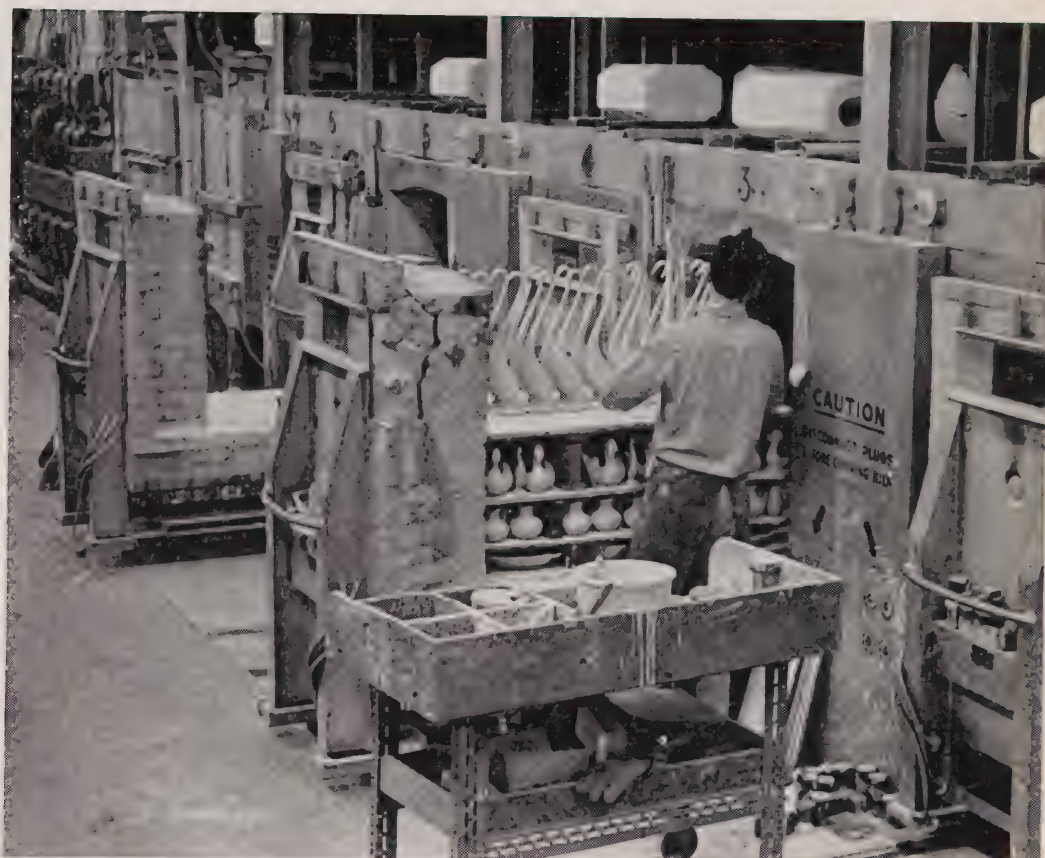
The original small plant has since been sold. So has the Blue Mountain Pottery which is now a division of the International Silver Company.

The models that will eventually become a part of the Blue Mountain Pottery collection come from the nimble fingertips of 35-year-old John Bock, a native of Dusseldorf. His original, shaped in plasticine or gooey clay, is used as the pattern for a master mould, fashioned in plaster because of its absorbent qualities.

Slip, a creamy mixture of clay and water, is poured into the mould, which absorbs



as in the mind of a Blue Mountain  
ttery designer take shape on paper to be  
er translated into clay on the potter's  
heel or in moulds before baking in  
ctric kilns.





*Artware is skillfully trimmed, then decorated, before going to the kilns for glazing. Although the finished product emerges with a smooth, fluid pattern, no two pieces are identical.*

much of the water to leave a crust of clay on the mould wall. Once the desired thickness is attained, the excess material is drained off and the hardened clay removed by highly-skilled craftsmen, who pare away the seams with surgical skill.

Blue Mountain artware is baked three times in large electric kilns. In the final firing, it is thickly painted with glaze, put into the kilns at room temperature and left there until the oven reaches 2,000 degrees Fahrenheit. The glaze, the recipe of which is a well-guarded secret, runs smoothly together at this temperature and the finished product emerges with a smooth, fluid pattern. In fact, no two Blue Mountain Pottery pieces are identical. At present, the pottery uses 14-kilowatt kilns although 75-kilowatt ovens are now on order to speed production



Despite mass-production methods all is not lost to automation. Any of the 200,000 visitors who flock to Blue Mountain Pottery each summer have the chance to see the potter's wheel still in use at one of the studios.

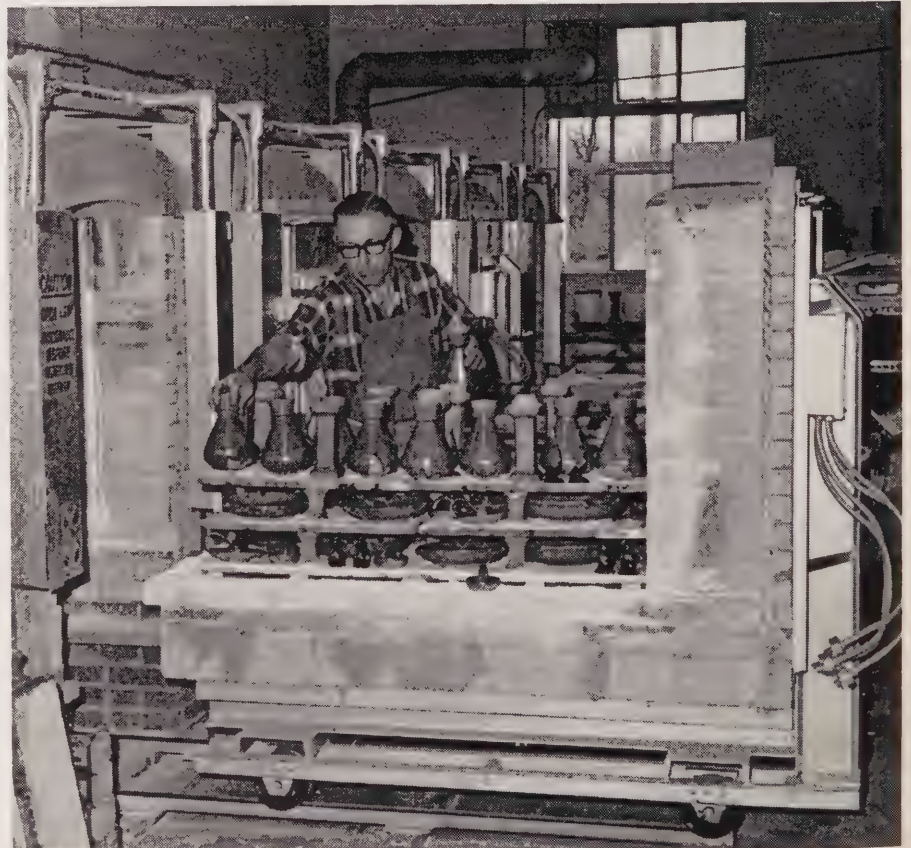
There, from an observation platform, they can watch experienced and sensitive hands shape a vase, a jug, a coffee mug or any one of a score of household items from a formless lump of clay

The Blue Mountain Pottery and other smaller potteries have certainly had an influence on the local economy. Last year, the town proclaimed itself the pottery capital of Canada — there's more artware produced here than anywhere else in the nation — and a pottery and art fair started last summer attracted 5,000

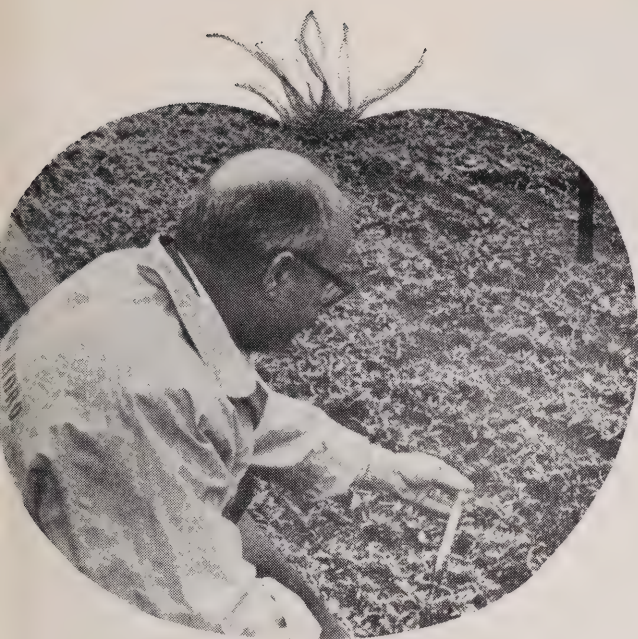
Mr. Dube, who heads the Chamber of Commerce, likes to think Blue Mountain Pottery is also in the tourist business. He figures the area can, and should, double the \$40 million in tourist revenue it now reaps annually.

And when asked why there's so much green in Blue Mountain Pottery, he simply shrugs his shoulders and says: "That's what the people want, I guess."

He's got a world of experience to prove it







## Ontario experiments with electric heating cable may revolutionize an entire industry

# young tomatoes like a nice warm bed

A Norwegian engineer was inspecting a network of overloaded underground cables in 1922 when he noticed that the vegetation above them was greener and more advanced than elsewhere.

He decided that the heat from the cables was responsible and thus accidentally stumbled on an efficient and easily controllable means of accelerating plant growth in a cold climate.

Today, a number of Canadian plant and vegetable growers are making increasing use of the idea. Lengths of thin electric cable, zig-zagging some six inches below the surface of the ground, could well be the salvation of the tomato industry in southwestern Ontario, for instance.

Growers in the area are keenly watching an experiment on a farm near Leamington in Essex County. Basically, it involves the use of electric cable in soil beds to force the germination and growth of tomato plants.

If successful, the experiment could well revolutionize the whole industry, slashing production costs in half and giving Canadian growers a fighting chance in their battle against US competition.

Most area growers do not have the facilities to start their own plants, and those who do cannot produce the quantities and varieties required by the processing companies.

The answer has been to import started plants or seedlings from Georgia at a cost of more than \$10 a thousand. But in recent years, the land has not been ready for planting due to a series of wet springs and many thousands of dollars have been

lost through plants rotting while awaiting replanting. In fact, the situation is so bad that several growers went out of business this year.

Cable heating could change all this. It could mean direct planting of seeds in the fields, eliminating the maintenance and capital cost of greenhouses with a consequent reduction in production costs. The major benefit would be the availability of plants when the soil is ready without having to depend on costly imported seedlings.

Stan Stewart, an Ontario Hydro farm sales supervisor, is optimistic about the experiments being applied on a broad scale.

They're being conducted on the farm of Bud Bradley, about three miles east of Leamington. Mr. Bradley grows about two million plants a year, the majority being sold to a local processing plant for redistribution to other growers.

The cable installation consists of copper resistance wire covered with PVC for protection against the moisture. Copper grating is added for grounding and strength. The estimated cost of growing 1,000 plants is 75 cents, the heat being automatically controlled to maintain a constant temperature of about 65 degrees.

The experiments first began in April, 1967, on the H. J. Heinz farm in Leamington where electric cable was installed four to five inches below the surface in cold frames. At that time, the soil temperature was 55 degrees. Two days later it was 77 degrees and suitable for planting tomato seeds.

To obtain a true comparison, a second frame was built next to the first, exactly the same size and with the same type of soil but without the heating cable.

Each bed was planted on April 19 with 1,100 seeds and 1,100 transplants from a greenhouse. Six days later, the seeds in the heated bed began to push above ground even as the outside temperature ranged below 39 degrees. Those in the unheated frame did not show through until May 1.

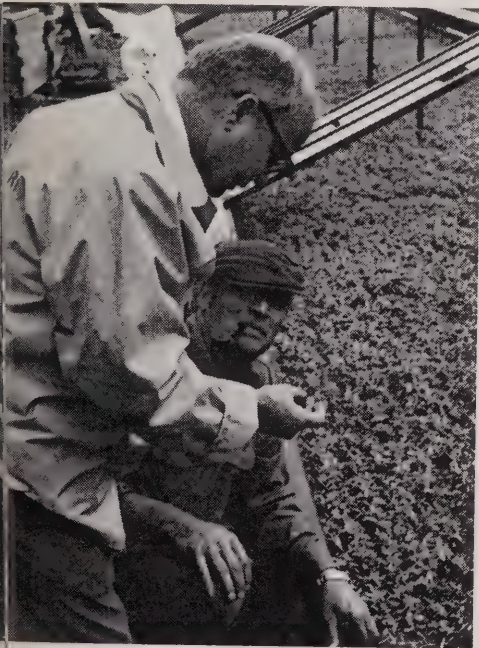




*Stan Stewart examines seedlings in heated bed, which shows up in sharp contrast to unheated soil in the foreground.*



Mr. Stewart discusses cable crop with farmer Bud Bradley and also looks at tomato plants grown in a greenhouse in the conventional manner. Machines takes reels of tape containing seeds spaced one inch apart for easy planting.



In another 10 days, seedlings in the heated bed were as large as the transplants in the unheated frame and were ready to transfer to the fields by May 29. The seeds in the unheated frame did not grow significantly and were lost.

Electricity used during the experiments cost about \$11, the bulk being consumed as temperatures fell at night.

In 1968, the experiment was transferred to Mr. Bradley's farm.

This year, 20,000 seeds were sown in the open in both heated and unheated areas. At the end of April, tomato plants in the heated soil showed through in strong contrast with the adjacent unheated surface.

And the experiment was given an extra slant with the introduction of strip-planting. In this, seeds are placed about one inch apart in narrow strips of white material. The strip is buried in the ground at the required depth and disintegrates with the first rainfall, leaving the seeds well-spaced.

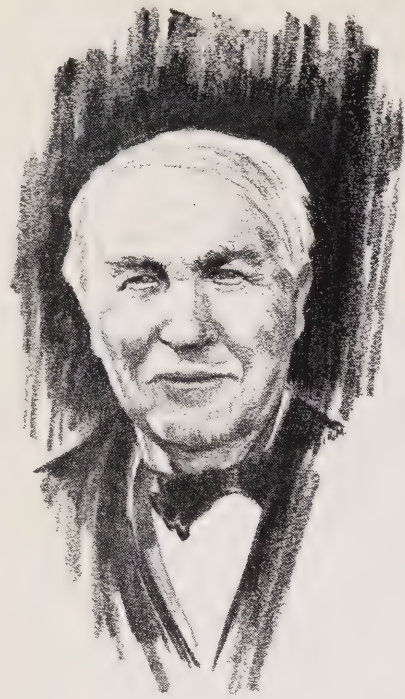
Mr. Stewart says this could mean the introduction of strip-planting directly into the fields — probably by machine. This would eliminate the costly process of sowing the seed in trays, germinating them in greenhouses and transplanting them either in greenhouses or in cold frames.

Already, the experiments have drawn a great deal of interest. Officials from the Department of Lands and Forests have visited the Bradley farm and may adopt the idea to grow trees on department land at Swastika, near Kirkland Lake. Other growers in Oshawa and Pickering are making extensive use of cable heating in their greenhouses while 30 miles from Leamington, on the jet-black soil of Erieau, Robert Vermeersch is using electric cable on a smaller scale to help raise celery seedlings.

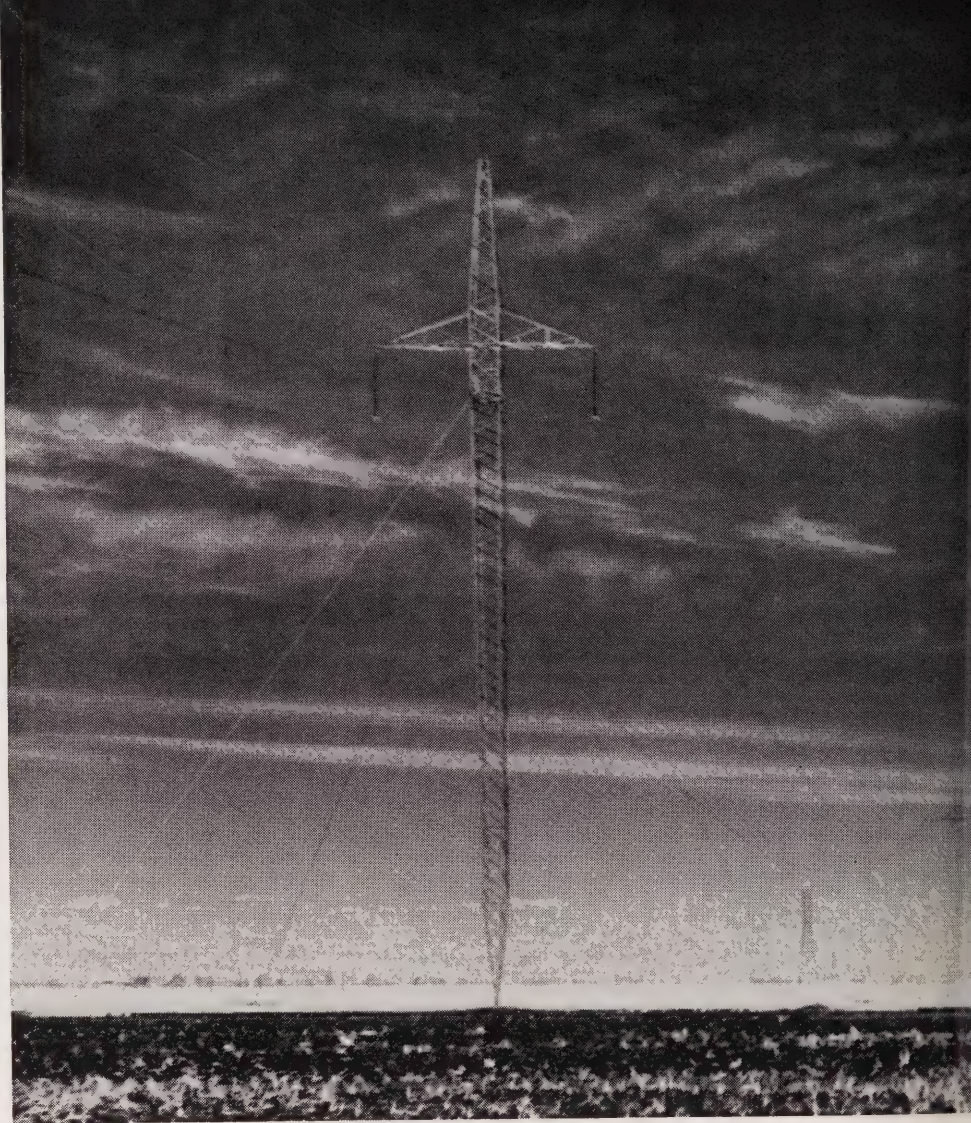
This is the third season Mr. Vermeersch has used the technique after reading about the Essex experiments. About 70,000 celery seedlings planted this year will have the advantage of an estimated 10 days' growth over unheated seedlings come transplanting time.







## oh Mr. Edison you haven't lost yet



One of the most intriguing battles in industrial history was waged nearly a century ago by two of the great electrical pioneers – Thomas Edison and George Westinghouse. Their squabble was over the relative merits of alternating and direct current transmission, and it raged long and bitter.

Westinghouse started the controversy with the installation in Buffalo in 1886 of the first commercial AC lighting system. Edison, who had sold hundreds of DC generators and rightly judged his own power system to be threatened, fought high-tension AC on the grounds of its danger.

He made great capital, for instance, from the introduction by New York State of the electric chair, which was wired for AC (unfortunately, the executioners bungled the job and the first victim died rather less than painlessly).

However, AC eventually won out because of its flexibility. It can be generated at

any convenient voltage, stepped up by transformers for the purpose of transmission and stepped down again at the receiving end. Raising the voltage is like raising the pressure of water in a pipe – it allows the current to be pushed a much greater distance. Edison's low-voltage DC power could not be transmitted economically more than a few miles; once certain safety problems had been overcome, high-tension AC could be sent virtually anywhere.

One might have thought the issue was settled for good. But like so many ideas abandoned because they were in advance of prevailing technology, it remained dormant only to re-emerge in 1950 with the construction of a 60-mile underwater high-voltage DC link between the Swedish mainland and the island of Gotland.

Since then, HVDC transmission lines have blossomed in several parts of the world and the question is why, suddenly, the revived interest?

Basically, the answer is one of economic related to a pressing need in the seventies to move large blocks of power over vast distances. The fundamental difference between DC and AC is that while the former flows in one direction only, alternating current changes its direction at regular intervals (this reversal occurs 60 times a second in the Ontario Hydro network). DC is normally transmitted along two conductors compared with three conductors for a conventional three-phase AC circuit.

The result is less conductor, lighter transmission towers and less right-of-way, all which may bring substantial savings over several hundred miles. But these must be weighed against the cost of expensive rectifying equipment at each end of the line to turn the AC into DC and back again.

Ontario Hydro engineer Neil McMurtrie says the break-even distance – the point at which savings on the DC line exceed





*Savings in space are evident when comparing trial stretch of HVDC line with conventional AC line on the right.*

cost of the terminal equipment — is between 300 and 400 miles. However, any intermediate tap-offs to supply local loads also require rectifying equipment and thus upset the cost picture.

The only single transmission line in Ontario that comes anywhere near this is the 1,000-mile line that transmits power at 735,000 volts from hydro-electric stations in the James Bay watershed to the Toronto area. Power is tapped from this line near Sudbury and Barrie and it is highly unlikely it could ever have operated as an economic HVDC link.

Several HVDC transmission lines built or under construction in other parts of the world, the most ambitious is the newly completed Pacific Northwest-Southwest route running 850 miles from the Columbia River to Los Angeles. The power rating of this 800,000-volt, 1,440,000-kilowatt connection is more than double that of any existing DC system. It is also the first high-voltage DC line that is

entirely above ground.

All previous DC lines have run underwater for at least a portion of their length, necessitating the use of heavy insulation. Direct current gives them a considerable advantage over conventional AC cables in which the fluctuating current charges and recharges the insulated line many times a second until a point is reached — around 25 to 35 miles depending on the voltage — where little or no current is actually transmitted.

Because it operates at a constant voltage, DC maintains the charge on the cable. It also permits about double the AC voltage with the same amount of insulation. Among the most notable HVDC lines are a 38-mile link across the English Channel between Britain and France, a 100-mile cable from Sweden to Denmark and West Germany, most of it underwater, and a 380-mile line connecting New Zealand's big North Island hydro-electric development to the South Island. All but

25 miles of this line is overland.

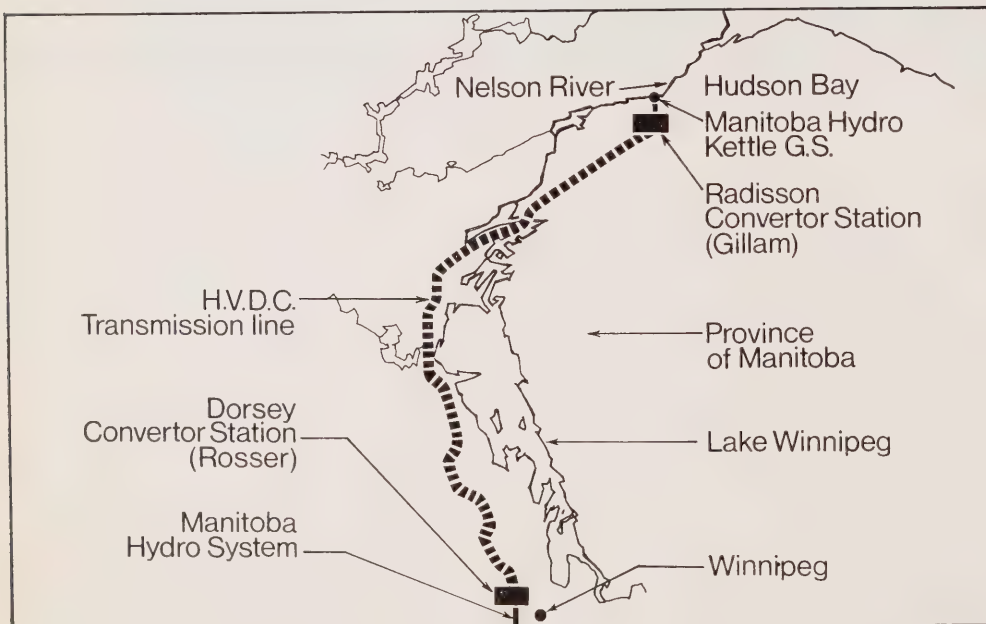
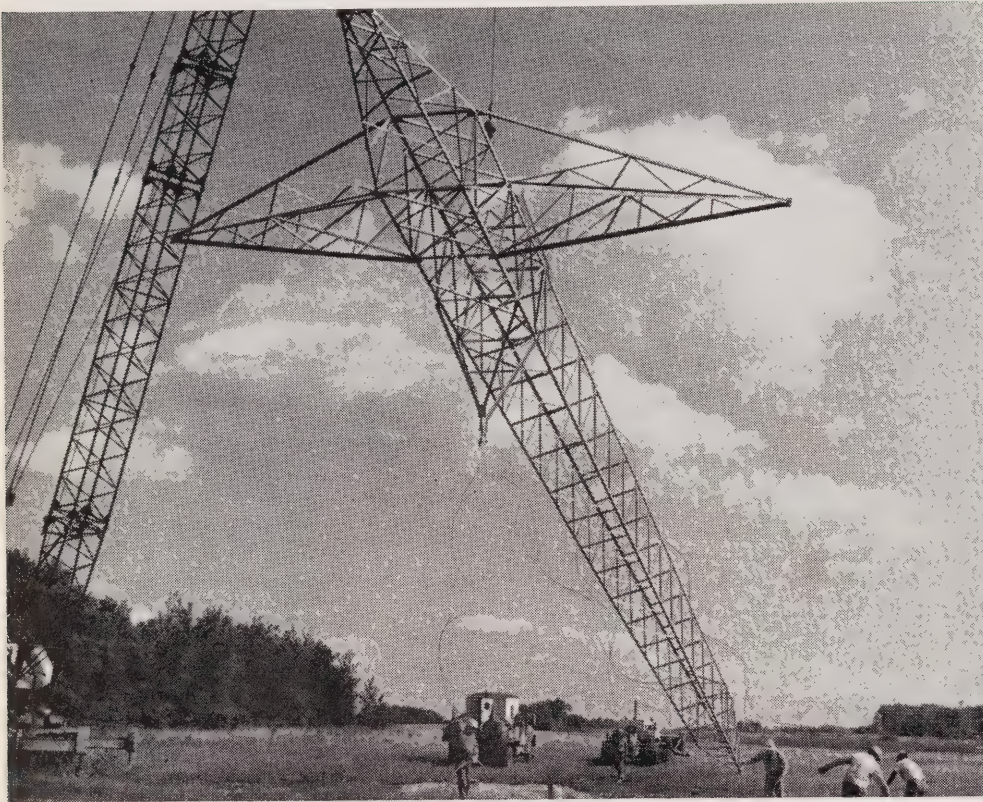
In Canada, Vancouver Island was linked to the BC mainland last year by three HVDC cables running beneath Georgia Strait and Trincomali Channel. But this will be dwarfed by a 450,000-volt DC line being built by Atomic Energy of Canada Ltd. between the Nelson River sites of Manitoba Hydro and Winnipeg, 560 miles to the south.

Since practically all the world's power is generated and used as AC, the key to HVDC transmission lies in an efficient means of converting the current at each end of the line and also acquiring voltages high enough to push it several hundred miles.

Mercury arc rectifiers — heavy vacuum tubes or valves in which alternating current is forced to flow in only one direction between a pool of mercury acting as cathode and a metal anode — have been in use since the turn of the century. But they were restricted to either high currents



Atomic Energy of Canada Ltd. is building this 450,000-volt DC line from Manitoba Hydro's Nelson River sites to Winnipeg, 560 miles to the south.



at low voltages or, conversely, low currents at high voltages because of arcing problems.

In 1929, Dr. Uno Lamm, of the Swedish electrical giant ASEA, hit upon the idea inserting a series of electrodes between anode and cathode to buffer the force with which the current hit the anode. Even so, it was the early forties before he was able to develop a practical high-voltage converter.

All major HVDC transmission systems in use today now incorporate similar mercury arc rectifiers. They're extremely expensive but over a long distance their cost is more than compensated for by substantial savings in transmission line materials and rights-of-way. Yet a development now taking place in Canada could herald a breakthrough of the utmost significance to HVDC.

In its scheme to buy large blocks of energy from Hydro-Quebec, the New Brunswick Electric Power Commission is building a high-voltage direct current converter station at the intertie between the two systems at Dalhousie. This is no conventional DC line with converter stations at each end — instead, the converter equipment will change the 230,000-volt AC supply to DC and immediately back again.

The reason for this unique back-to-back arrangement rests with yet another advantage of direct current: it requires less voltage regulation and will not contribute to system instability.

Because of the differences in their power networks, both utilities decided they need to operate their AC systems independently. The only purpose of the DC link is to act as a buffer between them. But the real breakthrough lies in the type of converters being installed. Making use of space technology, the New Brunswick utility has opted for a solid-state device known as a power thyristor.

Whether the cost of solid-state rectifiers can be reduced to the point where they make HVDC transmission an economical proposition over relatively short distances remains to be seen. Certainly, the electrical world will be watching the performance of the New Brunswick-Quebec intertie with interest.

It seems likely, though, that more HVDC installations will make their appearance. The probability of underground high-voltage lines in urban areas, the expense of acquiring vast tracts for rights-of-way and the desirability of locating new power plants some distance from our cities may well hasten the day. □



# bucket truck bonanza





From daybreak, the sun pierced bright blue skies and beat down relentlessly on Stratford's fairgrounds. In the morning, the dress was business suits. By the afternoon it was hard hats, shirt sleeves and sunglasses.

The crowds milled around big trucks, and little ones, around pole lines, underground systems, a giant mobile distribution station and a few pennies' worth of silicone lubricant. It was showtime in Canada's festival city.

Well over 1,000 visitors came from British Columbia and Newfoundland, from California and Egypt, and from all over Ontario to see the latest hardware at the Association of Municipal Electrical Utilities fifth equipment display.

Even a group of 20 electrical and electronics students made the 20-mile bus trip from Listowel District Secondary School to view the wares of 82 exhibitors. In all, more than \$1 million worth of equipment was spread over the five-acre site.

Thunder Bay Hydro's new bucket truck made its début at the fairgrounds as did Ontario Hydro's latest portable distribution station. The \$95,000 mobile unit had left the manufacturers only that morning and was en route for the Palmerston area, where it was to be pressed into service during a voltage change.

And North America's latest "swinger," a highly sophisticated \$55,000 revolving derrick and aerial bucket, also made its first appearance in Canada at the show.

While the prime purpose of the show was to familiarize utility people with the latest techniques in the power supply business, manufacturers and utilities expect to do business amounting to several millions of dollars as a result of it.

But the emphasis was on education. For instance, Electrical Utilities Safety Association crews carried out maintenance work on live overhead and underground lines. The overhead system was of a new type, designed with aesthetics in mind, by the Windsor Utilities Commission and the AMEU.

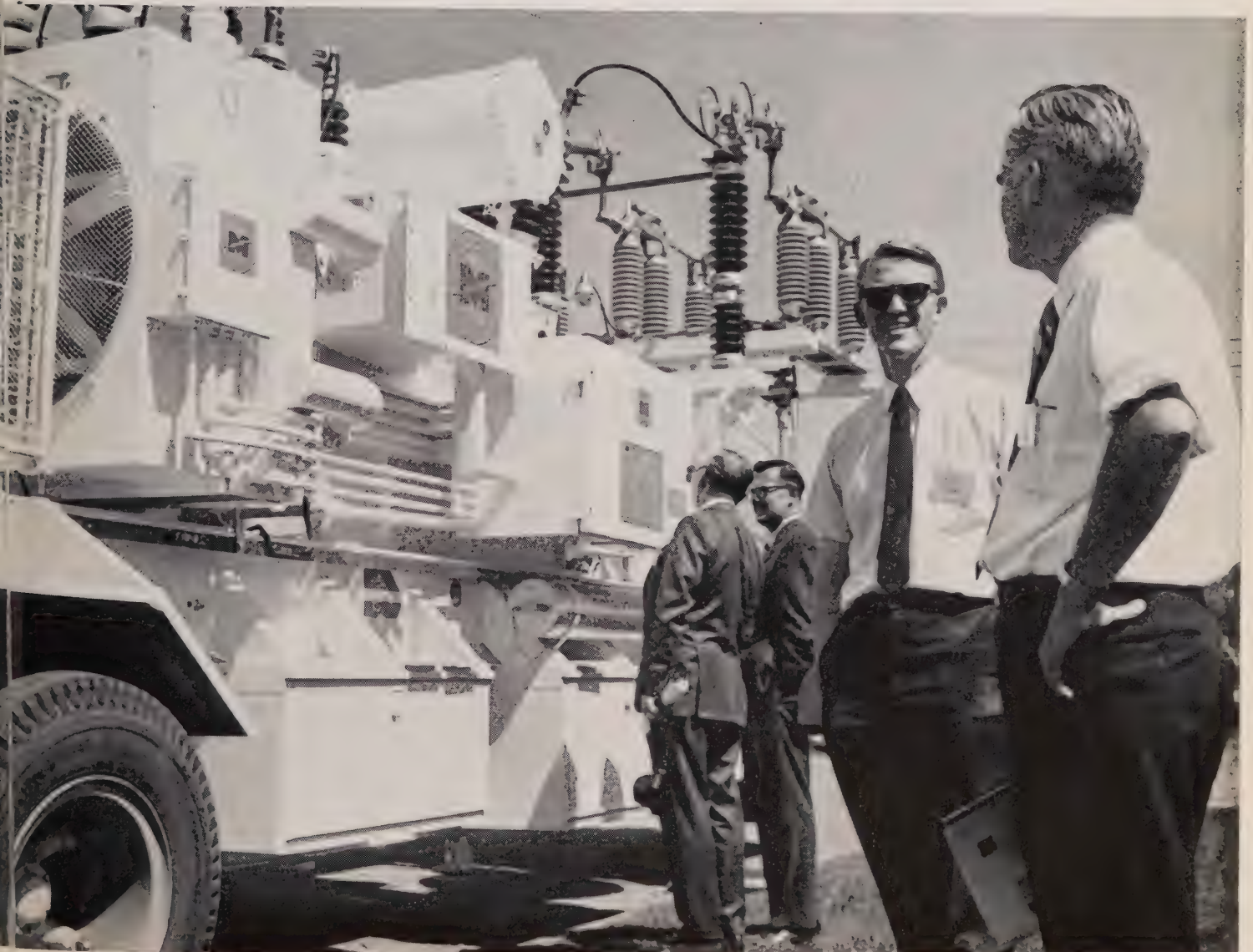
Among the attractions at the two-day event was a streetlighting demonstration featuring different types of light sources and the flying in and placing of a hydro pole by helicopter. □







*Exhibits ranged from highly-sophisticated and expensive bucket trucks to line hardware costing only a few pennies. Below : a portable distribution station in use by Ontario Hydro.*





# along hydro lines



## Second doctorate

A second honorary Doctor of Laws degree has been conferred upon Ontario Hydro Chairman George Gathercole.

Mr. Gathercole was one of five honored by his alma mater, McMaster University, at its spring convocation last month. The citation said in part, "... before us stands today a man who has distinguished himself as an economist, professional athlete, and in the public service ... from the beginning his career has been devoted to the service of the community ..."

Mr. Gathercole obtained his BA degree from McMaster in 1935. He received an honorary Doctor of Laws degree at York University in 1966. □

## Dual role

Ontario Hydro's executive manager—regions, Donald B. Ireland, has been appointed assistant general manager—regions and marketing. He takes over the marketing branch from D. J. Gordon, who was recently appointed general manager.

The new position places the work of the regions and marketing branch under the same administrator.

Mr. Ireland was superintendent of Hydro's Stratford area from 1933 until moving to a similar position in Owen Sound in 1946. He transferred to head office as assistant municipal service engineer for Central region in 1953 after a five-year stint as Georgian Bay consumer service superintendent. He was director of consumer service for seven years prior to his appointment as executive manager—regions in 1968. □



Donald B. Ireland

## 50 years young

Utility and civic officials got together at Scarborough Golf and Country Club last month, but they weren't there to play 18 holes. Rather, they teed off on celebrations commemorating Scarborough PUC's golden anniversary.

Mayor Robert White paid tribute to the utility for 50 years of service to the borough and Metro Chairman Albert Campbell, a former Scarborough mayor and member of the PUC, outlined its history.

Ontario Hydro Chairman George Gathercole said that when Scarborough PUC was formed, Ontario Hydro was building the first of the two Sir Adam Beck plants on the Niagara River—that time the largest power plant in the world. "But time change," Mr. Gathercole said. "Our Pickering nuclear plant, not too far from here, will produce more power from a single unit than all 12 at the original Queenston development."

He added that Scarborough industry is making a significant contribution to the Pickering development through the manufacture of mechanical and electrical components for it and other power stations currently under construction.

After a dinner and the presentation of an engraved silver trophy to Mr. Campbell "for his long and valuable service as a commissioner," guests toured the renovated PUC headquarters.

Cutting the traditional anniversary cake are Mr. Gathercole, PUC vice-chairman M. W. Broley, PUC chairman R. E. Cavanagh, Mr. Campbell and Mr. White.



A slice of the action

## Another decade

Scarborough PUC's headquarters has gained a new lease on life. Renovation of the top two floors has postponed the need to erect a new main office for at least another decade. Commission chairman Dick Cavanagh says the utility will ultimately be located in the borough's municipal centre.

The \$100,000 renovation job follows the office landscaping principle and presents a delightful environment featuring new furniture, carpeted floors, ultra-modern fluorescent lighting and acoustical tiled ceilings.



Old place gets a new look



## ... the cleanest ...

critical energy is the cleanest thing that ever happened to Ontario, says D. K. A. Gillies, Ontario Hydro's senior meteorologist.

Speaking at an OMEA-AMEU public relations co-ordinating committee seminar in Toronto, Mr. Gillies said electricity was possible for the release from use of thousands of small, inefficient, smoky, gas-producing steam engines for driving the wheels of industry. "Without the arrival of clean hydraulic-generated energy from the 1920s onward, we would be swamped with pollution many times higher than present levels record," he added.

One method of achieving acceptable levels of sulphur dioxide in the air is by allowing nature to diffuse and dilute the gas to a tolerable concentration, Mr. Gillies said. "This philosophy isn't acceptable to many environmentalists, who demand removal of the gases, not merely dilution. But the dilution principle has been used for years — even in the ventilation of homes."

Mr. Gillies agreed it is paramount that excesses of pollutants which damage air, water and soil be reduced or eliminated. But, he cautioned, this could create yet another problem. "If all the toxic gases currently diffused in the atmosphere were contained in a chemical process there would be such an over-capacity of sulphur, sulphur dioxide and sulphuric acid that it would be impossible to comprehend," he said. □

## Friend and protector

Ontario utilities have nothing to fear from Municipal Affairs Minister Darcy McKeough through the introduction of regional government, says the head of the Ontario Municipal Electric Association's government legislation committee.

Speaking at an OMEA-AMEU public relations co-ordinating committee seminar, John MacBeth said that in Mr. McKeough's committee has found a "friend and protector, and it's up to individual utilities and the OMEA to keep him supplied with ammunition for the retention of separate and elected commissions for the distribution of electricity in new regional municipalities. Ontario Hydro has worked well in Ontario and we want to be sure it continues that way," Mr. MacBeth added. "The OMEA has informed Mr. McKeough that regional government can adapt to the local Hydro system, just as the local Hydro system can adapt to regional government."

His sentiments were echoed by Arthur Meen, York East MPP and a former chairman of the government legislation committee. Meen said what is most reassuring to him is the position of the Minister in regard to the Hydro operation.

While Mr. McKeough feels the supply of water should be part of the municipal function, he does not feel the distribution of electricity should also be," Mr. Meen said.

But Andrew Fame, OMEA first vice-president, wasn't so sure. He said Mr. McKeough was quoted in the press as having told a group of law students at York University: "We would do away with all special purpose bodies, such as public utilities commissions, if we had our way."

Mr. Meen pointed out the Minister said he'd been misquoted. □

## TV ever catches on ...

Any utility man in the province, and he knows Ron Mathieson. Last month, the manager-secretary of the Association of Municipal Electrical Utilities celebrated his 25th anniversary as a member of the Hydro family.

Mathieson joined Ontario Hydro in 1945 as a writer in the promotion department and in 1947 was hired on a part-time basis by the AMEU. In 1951 he was appointed assistant



*Quarter-century of service*

to the director of the newly-formed public relations division and three years later became a full-time AMEU employee.

He says the changes in Hydro have been so radical that his job has altered completely in 15 years. Mr. Mathieson remembers hearing a paper back in his early AMEU days which suggested that if TV ever caught on, electrical loads would be astronomical. And he remembers discussion after discussion on the possibility of using two-way radio in the municipal utility operation. Very few utilities, if any, don't have radios now.

"Formalized training, labor relations, cable television, and the like are now the big thing with the AMEU," he says. "Of course," he adds, "so is regional government."

Ontario Hydro's general manager D. J. Gordon (right) presented Mr. Mathieson with his quarter century certificate and E. Grant Bainbridge, consumer service director, handed over a record collection featuring big bands of the thirties. □

## Safety conscious

The nuclear industry, unlike other industries, has developed with safety and environmental considerations as its paramount concerns and potential hazards have been realized, and controlled, since the inception of industrial uses of the atom, says Dr. Glenn T. Seaborg, chairman of the US Atomic Energy Commission.

A Nobel prize winner, Dr. Seaborg is regarded as one of the world's great authorities on nuclear power. He told more than 400 delegates attending the Canadian Nuclear Association's annual conference in Toronto last month every industry is being caught up in the swirl of interest in the protection of the environment "so it's not surprising that the nuclear industry has become involved."

"Talking with people is one of the best ways I know to tell the nuclear story," Dr. Seaborg said. He added he and his staff had spoken to many audiences across the US explaining the role of nuclear power, the safeguards and, most importantly, the alternatives.

However, he said, "it's clear that we must do more to make sure the public understands what we are doing and why. In the nuclear area, people must understand, for example, that the levels of radiation permitted to be discharged from nuclear plants are based upon recommendations of the finest international expertise and that actual discharges are limited to only small fractions of these internationally accepted standards."

And he feels there should be more emphasis placed on the nature of radiation, its types, and relative hazards. More emphasis should be placed on informing the people of the natural background radiation in which man has lived since time began.

The effects of warm water discharge from power plants must be spelled out. Dr. Seaborg said people must be made to understand



that warm water discharge can be localized, or minimized if this becomes necessary and in some cases this heated water can be put to beneficial use.

"Today's outcries about the environment will be nothing compared with the cries of angry citizens experiencing blackouts which could endanger the health and lives of their families," Dr. Seaborg said. □

## World leaders

Canada's nuclear scientists, says Energy, Mines and Resources Minister J. J. Greene, are now leaders in the field and must be kept together and given worthwhile and important projects so they can stay on top.

Speaking to the Canadian Nuclear Association's annual conference, Mr. Greene said there must be "no Arrow" in respect to Canada's nuclear program — a reference to the cancellation of the Arrow aircraft being built in Canada in the 1950s. Many of the project's aviation experts moved to the US.

"Canada needs her nuclear scientists and their success, their training and know-how and their expertise in that unique and great Canada of tomorrow," Mr. Greene said. "We must never disband our nuclear team."

In a 35-page speech detailing all of the energy resources available in Canada, Mr. Greene stressed the prime objective of the federal government is to ensure that heavy emphasis is laid on Canadian control.

"We seek to control our resources, to have control of their development reside in Canada and, above all, to insist that control embraces the interests of Canada and conforms with the objectives and aspirations that we as a people have for this country," Mr. Greene said.

He reaffirmed the government's faith in the Candu natural uranium, heavy water moderated reactor system. Mr. Greene served notice that all steps would be taken to make sure the team of scientists who conceived the project would stay together. □

## Keep elected commissions

Ontario Hydro has called for the retention of elected commissions for electrical distribution in each of the new areas established under the provincial government's regional municipality set-up.

In a brief to Municipal Affairs Minister Darcy McKeough, Hydro says electrical distribution in each of the new areas under regional government should be operated by a commission similar in structure to that of the present municipal utilities.

The regional government system eventually will change the form of municipalities across the province and affect the administration and size of municipal utilities and Ontario Hydro's rural distribution system.

The Hydro brief generally agrees with one submitted earlier by the Ontario Municipal Electric Association. The OMEA brief also called for the retention of elected commissions.

Recommendations contained in the Ontario Hydro brief point out that Hydro and its associated municipal utilities across the province achieve considerable uniformity of planning, equal participation in benefits and sharing of costs over wide geographical areas such as those planned for regional government.

Among the recommendations were: separately-elected commissions to operate the municipal distribution systems; study by a special committee, probably composed of Ontario Hydro and municipal utility representatives, of the ultimate form of the new Hydro structure; one retailing organization within any one area identified by municipal boundaries, and protection by legislation of personnel of Ontario Hydro and existing municipal utilities so the well-being of staff members will not be jeopardized by changes in supply authorities.

The brief concludes: "Effective rationalization of electric power distribution can be achieved within the framework of the existing and already proven, Hydro system."

# municipal briefs

**Waterloo County** utilities have been given assurance that Municipal Affairs Minister Darcy McKeough doesn't consider the "special purpose bodies," therefore their chances of disappearing are slim. John MacBeth, head of the OMEA's government legislation committee, told representatives from nine of the 12 court utilities in Galt that the provincial association's brief to Mr. McKeough urges retention of separate, elected, local commissions for the distribution of electric power throughout the new regional municipalities.

**Kitchener PUC** will combine its gas and electricity bills and have one man read the meters every month. The move, prompted by the utility's conversion to computer billing, was made in an effort to cut costs. Without it, another meter reader would have to be hired for around \$9,000 a year.

**Ridgetown PUC** keeps the interests of its customers at heart. The utility has switched from the traditional bi-monthly billing to monthly billing to "help make payments easier," says manager C. W. King. While they were at it, they switched to computer time-sharing with London PUC. Mr. King says the changeover "has been rough, but we're certain it'll work out all right."

**A 45-year Hydro career** has come to a close for Eric J. Sims. An Ontario Hydro's Northeastern region municipal accountant, he retired last month. Mr. Sims began his utility career with Northern Ontario Power Company at New Liskeard in 1925 as a bookkeeper and branch inspector. He served as a bookkeeper for the New Liskeard area with Ontario Hydro and as a payroll clerk in New Liskeard and North Bay before being appointed plant master in 1948. He was named municipal accountant in 1958. His immediate retirement plans call for a trip to his native England and a tour of Europe.

**Everett M. Jenkins**, a line foreman with North Bay Hydro, has been named manager of Newcastle PUC. He succeeds Tom Messenger. Mr. Jenkins worked for a number of years as an electrician at New Ryan Lake Mine before joining Ontario Hydro's Northeastern region's line staff at North Bay. He subsequently became lines superintendent for Widdifield Hydro and subsequently joined North Bay Hydro.

**A. K. Steels**, the man who played a large part in the formation of the utility marketing organization, Compec, has been appointed sales superintendent of Ontario Hydro's Western region. Steels was formerly sales supervisor in Essex area. He succeeds John I. Chute, who becomes Western region consumer services superintendent.

**D. D. Haig** has been appointed operations engineer for Ontario Hydro's Northwestern region. He succeeds J. J. Durand, director of public relations. Don Haig joined Ontario Hydro in 1944 and has worked in a variety of jobs around the province. From 1959 to 1962 he was plant superintendent for the Nipigon River stations and from 1962 to 1966 he headed Hydro's operations team at the Dez River power project in Iran. Since his return to Canada, Mr. Haig has served as regional protection and control engineer in the Northwest.





## as don wright sees it

...st what the synthetic seventies have in store  
...us gastronomically remains to be seen, but  
...me of the new developments which have come  
...our attention are enough to cause mass dis-  
...tinction even before they hit the table.

News that the major oil companies are hard at  
work trying to introduce heavy-duty detergent  
to our diets was followed by a bizarre account  
of some chemists who would have us sup on  
mucus commonly found in sewers but capable of  
being cultivated with the aid of natural gas. The  
most palatal affront is taking shape in Britain  
where they have discovered a way to convert the  
carbohydrates in such innocent items as yams  
and potatoes into protein "twice as good as  
beefsteak," says a government release.

Trenchermen will be inclined to regard any  
molecular abracadabra claimed capable of turning  
yam into something better than beefsteak as a  
bit of phoney baloney, but the process is claimed  
to be the ultimate in laboratory vittles because it  
can be made into any form of food.

"Flavors of all kinds can be introduced," the  
report adds, "and the protein can be made to  
taste and look like normal food - chicken, beef,  
fish or rice for example."

If nothing else, the new material should help  
the jaded housewife develop an interest in the  
arts. Sculpturing a baked salmon or tantalizing  
the master from this nutty putty protein should  
challenge her creative ability.

In fact, the real purpose behind the synthetic  
protein is probably to be found in the last three  
words of the dispatch. "Within five years," we are  
told, "it should be possible to produce the protein  
in any country from locally grown crops and also  
in materials which are at present regarded as  
waste - even as pollutants."

The scheme, quite obviously, is based on the  
well-known Latin proverb *ifum makuno messum*  
um. Loosely translated, this simply means  
that he who pollutes seeks sustenance in his own  
works."

The approach warrants further study. People  
use the pollution problem and it is only just  
that each should contribute toward the solution.  
The total mess can be reprocessed and served  
as the *pièce de la résistance* at dinner then  
the home free. Public relations will have a role  
to play as resistance can be expected from the  
reactionaries - especially those with vivid imagi-  
nations and weak stomachs.

Whether or not we can gnaw our way to a

cleaner tomorrow remains to be seen, but the  
theory is intriguing and it could be that the teeth  
of the nation could be put to work on other  
pressing problems of the day.

Ottawa might keep this in mind in coming to  
grips with growing unemployment and the wheat  
surplus. Students and others unable to find jobs  
could be shipped west by the trainload to spend  
the summer eating wheat.

Ditto with other farm surpluses. It's not too  
much to envision a permanent core of hard-  
jawed professional eaters ready to snap into  
action at a moment's notice. Gnash Wednesday  
could be proclaimed a national holiday and flag  
poles erected across the land for mastication day.

■ Unbeknownst to themselves, in all probability,  
a group of California students came pretty close  
to transgressing on our own inspired dental  
approach to world ills in a recent "chew-in." The  
event featured the chomping of 106,000 pieces  
of bubble gum on the theory that the soothing  
snap of thousands of bubbles would help promote  
peace and happiness.

If we do intend to tackle our problems with our  
teeth, time may be running short and we can't  
expect much help from the British. According to  
one authoritative journal, if a photographer were  
to wander at random among the adult population  
of England and Wales asking people to say  
cheese, more than one in three would not have a  
single tooth of his own to flash back at him.  
Nearly half of the people in the northern parts of  
Britain are edentulous (toothless) and females  
are worse off than males.

Actually, the same sorry situation prevails in  
the US in the younger age groups, but the avail-  
ability of dental care in the past shows up in older  
people. Americans who are beginning to get long  
in the tooth still have teeth with which to get  
long in.

■ If misery loves company, we can take comfort  
in the fact that some of our four-footed friends  
will be expected to join us at the synthetic supper  
table in the near future. Tests have shown that  
substantial savings can be made by feeding cattle  
extruded bits of polyethylene instead of hay as  
natural roughage. Three pounds of these king-  
sized plastic chiclets are said to replace seven  
bales of hay. The stuff simply remains in the  
animals' first stomach and stimulates the flow of  
digestive juices as did the old-fashioned cud.

And from far off Australia comes word of an  
outbreak of temporary blindness among cattle.  
Investigation traced the trouble to pipeline weld-  
ers. The afflicted animals had been gazing too  
intently at the bright arc of the welding torches.  
The problem was overcome by issuing farmers  
along the right-of-way with dark glasses for  
their cows.

Reports suggest the animals rather fancied the  
new look and a movement is afoot to popularize  
the fashion on the grounds that contentment  
makes the milk flow faster. Link this development  
with the plastic chiclets and the mind is apt to  
short circuit. Meadowlands dotted with bovines  
wearing bi-focals and popping bubble gum is a  
bit of a boggler.

■ Having tasted success in the cow cud field,  
the polyethylene people are eyeing even greener  
pastures. By the end of the decade they expect to  
develop a multi-million-dollar market for plastic  
paper. One daily newspaper in Italy has already

made the switch and special issues of company  
publications have appeared in plastic. Children's  
books, bookcovers and brochures are immediate  
targets.

Plastic inks have also been developed so that  
the reader remains the only link in the communi-  
cations chain where no improvement has been  
possible.

With the advent of plastic paper it will be  
possible to catch up on the news while reclining  
in the bathtub or even while totally submerged.  
On the other hand, cheques written on poly-  
ethylene may have a greater tendency to bounce  
and it may be necessary to develop a new breed  
of erasers. Department store catalogues will no  
longer be useful in their time-honored role as  
wipe-up man out back.

■ In an earlier column we told you about a  
mysterious and potent aroma which had sneaked  
into downtown Toronto and couldn't be tracked  
down. We thought it might have been due to  
flatulence on the part of the Jolly Green Giant.  
Well, it's been back two or three times since and  
the experts are now of the opinion it's simply  
"the concentrated essence of Toronto." The  
provincial air pollution people have decided there  
is no one source of the dead fish and sewage  
smell but that it's "an accumulation of city odor  
with quite a few industrial overtones."

Out-of-towners shouldn't get the wrong idea.  
The Queen City is still a nice place to visit and  
smells fine except for a few hot, muggy days each  
year when the old girl is a bit careless with her  
underarm protection. But it's safe to say that  
Essence of Toronto will never compete with  
My Sin on the drugstore shelves.

Nor is Lady Hamilton down the lake in any  
position to smirk. Indeed, air pollution readings  
from newly installed detection equipment in Steel  
Town indicate that Hamilton is no lady at all.  
First readings revealed air conditions four times  
worse than in Metro Toronto. All this without a  
single generating station!

■ Progress has struck Canadian Forces Base  
Uplands with a capital P. And we do mean P.  
Parliament has been in an uproar since it was  
announced that those familiar white porcelain  
receptacles in the airmen's lavatories had been  
equipped with electronic flushers.

Such pampering, moaned the MPs, for such a  
piddling purpose. As it turns out, the electronic  
system saves the base about \$15,000 annually in  
water bills. It replaces the old-fashioned type  
flusher which disgorged gallons of water mind-  
lessly at three-minute intervals even when there  
weren't any customers.

All is reported in hand at Uplands now but  
consternation held sway when the fly-boys first  
discovered the new devices. They resembled tiny  
cameras focussed on the action area - circum-  
stances which led some to believe that personal  
statistics were being recorded above and beyond  
the needs of the establishment. And that's about  
the size of the thing. □



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## power hunger

Ontarians have a king-sized appetite for electric power. To help relieve the hunger pains, Ontario Hydro is conducting an unprecedented generation construction program costing about \$2.7 billion. And it is estimated that Hydro will have to spend another \$500 million over the next five years just to deliver the power. Here the province's second extra high voltage transmission line is shown under construction between Sudbury and Parry Sound. It runs parallel to an existing 500,000-volt line brought into service in 1967.



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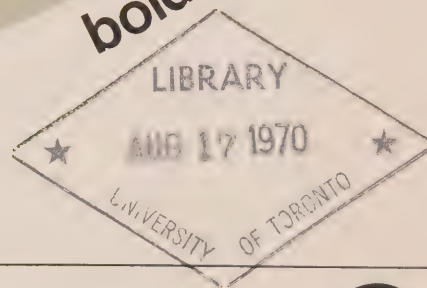
Cobalt lo  
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the silver lining . CSA approved .

with management in mind

bold new beginning for Bigwin .

Government  
Publications



**ontario hydro news**  
july-august/1970





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### the cover

An artist's impression of the \$69 million hydro-electric station being built for Ontario Hydro by H. G. Acres and Company at Lower Notch on the Montreal River. The plant is about 20 miles from Cobalt, which is now attempting to cash in on its colorful history as a mining centre (see opposite).

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## Viewpoint

# fuel and the future

As the name might suggest, Ontario Hydro and the power of falling water were synonymous when the utility was formed in 1906 to provide power at cost to the municipalities. And so it remained for the first half of this century.

Rivers provided all the electricity supplied by Ontario Hydro until 1951 when major thermal-electric stations went into operation at Toronto and Windsor. Coal thus became a secondary source of power and the only economical alternative to river stations.

Uranium established its right for consideration as a source of power in 1962 when a trickle of kilowatts entered the Hydro grid from the prototype NPD nuclear plant near Chalk River. And with the announcements this year that it intends to build a huge oil-fired plant near Kingston, and convert its Hearn plant at Toronto to natural gas, Hydro becomes involved with the full range of power fuels.

Further changes in the fuel supply picture may be expected as Hydro proceeds with a careful study of requirements at its various thermal-electric stations. A five-man task force has been appointed for this purpose and it will look very closely at the availability of low-sulphur fuels such as coal, uranium, oil, natural gas and liquefied natural gas under changing economic and social conditions. The study will include an analysis of transportation and distribution of the fuels to existing and new sites, handling and storage requirements as well as capital investment and energy costs of all alternatives.

Two interlocking factors underlie Hydro's growing concern with the wider spectrum of fuels. Environmental considerations are one. Hydro's desire to co-operate with the anti-pollution program of the provincial government means that it can no longer measure its fuel requirements with an economic yardstick exclusively. Combustion characteristics of the various fuels are a consideration of growing importance. In this respect, Hydro is carrying out in-house research on potential sulphur removal processes and contributing to outside development work.

A tight coal supply situation in the United States is adding immediacy to fuel re-assessment. All of Hydro's coal is imported from south of the border and last year there was a short-fall in deliveries of some 1½ million tons. This year shows no signs of improvement.

How did the picture change so drastically over the last few years? Supply and demand factors are changing. Concern with air pollution has prompted stringent new control measures across the United States with a consequent increase in the demand for low sulphur coal. Too, coal companies were pessimistic at the rash of new orders for nuclear plants two or three years ago and reluctant to invest in new mines. The situation has been aggravated by labor problems in the mines and by tough new safety regulations causing some to close.

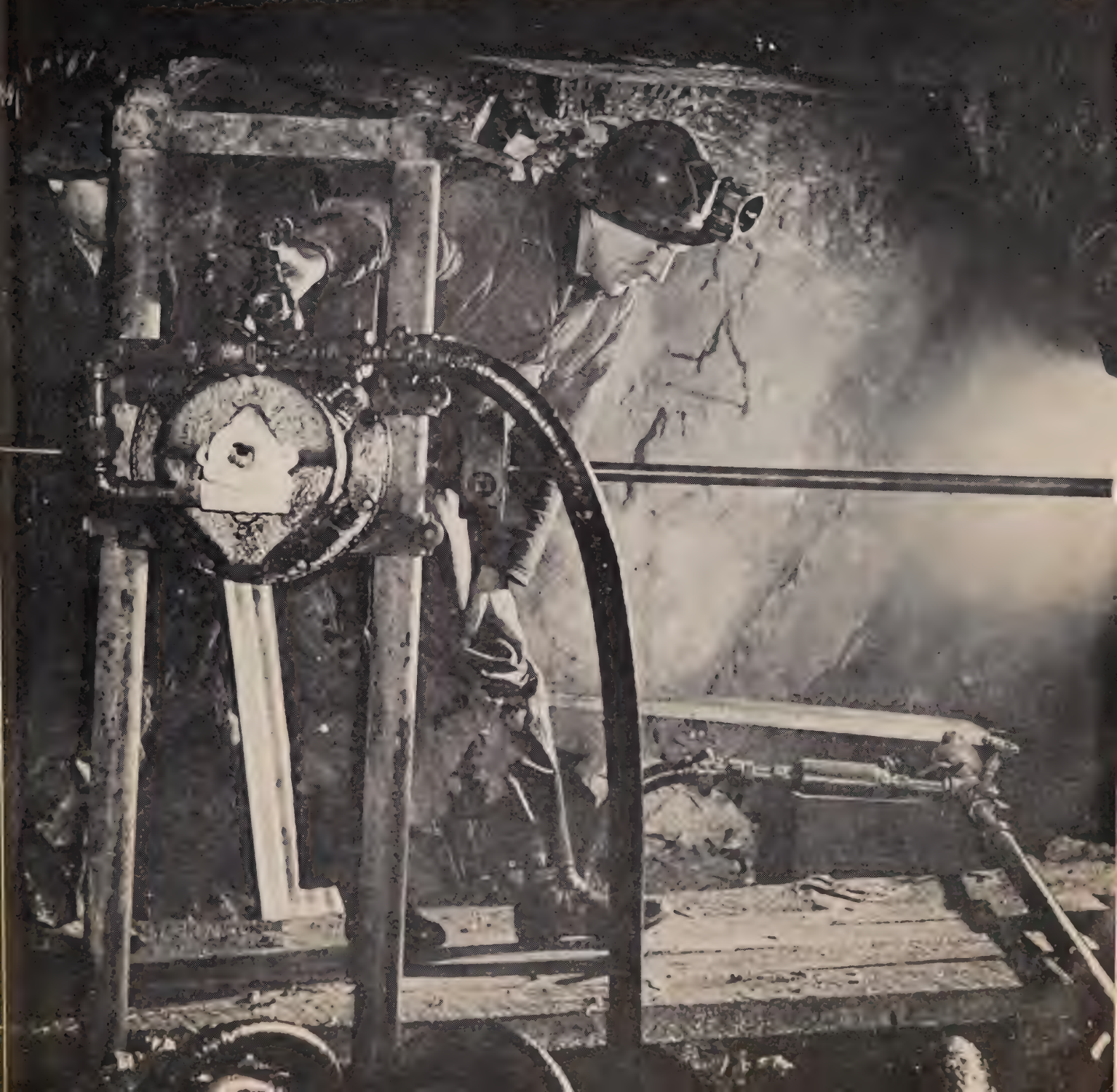
The fuel supply situation thus takes on new dimensions for Hydro which must now look at alternatives. Continental and off-shore resources become potential contributors to the electrical requirements of the province. It is still a question of raising steam for power by the cheapest and cleanest methods available but the horizons have been extended and the problems intensified by the new factors affecting supply.

Fuel acceptable for use in the sensitive seventies is bound to be more expensive. One of the biggest jobs facing Hydro is to minimize the impact of this additional cost at a time when so many other facets of the operation are under inflationary pressures. Change is the only constant in the increasingly difficult world of commerce and industry. What was impractical yesterday may well make sound economic and social sense tomorrow. □



# COBALT

looks for the silver lining







by John R. Hunt

Residents sometimes say it's the only living ghost town. Town planners have called it a nightmare. But hardy Cobalters wouldn't live anywhere else but their rocky little town, 94 miles north of North Bay.

Cobalt is only a shadow of its former self when it boasted 10,000 people, a dozen theatres, scores of bootleggers, a team in the original National Hockey League and was the centre of the richest silver mining camp in Canada.

But with a little of its traditional luck and a lot of hard work, Cobalt is coming back as a mining centre and as a major tourist attraction.

Today, mines are found after intensive prospecting, with all kinds of scientific equipment. But the discovery of silver at Cobalt was as casual and unplanned as could be.

On August 7, 1903, two lumbermen,

J. H. McKinley and Ernest Darragh, picked up some flakes of metal they found lying on the surface and sent them to Montreal for assaying. The report showed 4,000 ounces of silver to the ton, and the Cobalt boom was born.

McKinley and Darragh made a fortune, but over the years have lost most of the credit for the discovery to the more colorful Fred LaRose who found his silver six weeks later.

The Ontario government was pushing a railroad north to serve the pioneer agricultural and lumbering communities of Haileybury and New Liskeard. LaRose, a blacksmith, was sharpening steel on a hot September day when a fox stuck his head out of a nearby bush. LaRose, according to legend, threw his hammer at the fox. He missed the animal, but the flying hammer chipped a sample of silver from a rock.

LaRose showed his sample to a Haileybury hotel keeper, who forwarded it to the Bureau of Mines. Willet Green Miller, Ontario's first provincial geologist, was sent north to investigate and found the prospectors had opened up several veins.

Miller identified the metal as silver. His preliminary report mentioned "pieces of native silver as big as stove lids or cannon balls lying on the ground."

The report caused little interest in Toronto where the government was under heavy fire for constructing the Temiskaming and Northern Ontario Railway (now the Ontario Northland) into an area generally believed to be nothing but muskeg and forest.

But there was tremendous excitement when the first shipment of silver reached the south. A Bureau of Mines official wrote: "These shipments consisted of slabs of native silver stripped off the walls of a vein like boards from a barn."





*Construction of the Temiskaming and Northern Ontario Railway led to the discovery of silver at Cobalt in 1903. Adventurers and fortune hunters flocked to the area.*

was Willet Green Miller who scrawled "Cobalt" on a board and put it up by the railroad tracks, giving the town its name. Cobalt is usually found in association with the silver. It is used in a number of toys and commercial products while radioactive cobalt is employed in the fight against cancer. But except during the Korean war, when the US stockpiled the mineral, low prices have made it more a nuisance to the silver miners than an asset. In 1904, Cobalt was the scene of the oldest mining boom in Ontario's history. Every northbound train was crowded with fortune hunters, claim jumpers, promoters and adventurers.

In those days liquor could not be sold in a mining town, and some fortunes were made not from mining but from satisfying the thirsty. The Ontario government established its first northern provincial

police detachment at Cobalt to maintain law and order.

Silver was stockpiled like cordwood at the Cobalt station, and when the OPP investigated their first highgrading case they recovered more silver than was reported stolen.

There were 104 mines operating or being developed by 1908, and in 1911 the camp shipped 31,507,791 ounces of silver. The Cobalt area has produced more than 500 million ounces of silver in its life. For the past 10 years it has averaged five million ounces annually.

In the early days, the miners ripped the silver away from the surface and the surrounding area is slashed and scarred with massive rockcuts. The sun barely touches the bottom of some, and they are still "mined" for their ice in the summertime when thirsty Cobalters are having a party outdoors.

The town of Cobalt sprang up haphazardly. Houses were perched on rocky bluffs and the streets wind their way between them in glorious confusion. Many of the original flat-topped houses and false-fronted stores still stand, preserving the atmosphere of an early mining settlement.

Several major companies got their start in Cobalt. Sam Buckovetsky opened his first clothing store in a tiny log cabin, and went on to build a chain across the north. There was a wild race to get the first telephone lines into town, and when Cobalters heard that the New Liskeard-owned Northern Telephone Company was going to win they started to chop down the poles.

But Northern Telephone got the franchise and went on to build one of the biggest communications systems in the province. Two newspapers started in Cobalt —





"The Nugget," now published in North Bay, and the "Northern Daily News," now at Kirkland Lake. The respected mining journal, the "Northern Miner," was also born at Cobalt although today it's published in Toronto.

Lawyers had a field day in the early years with countless disputes involving mining claims. The revision of the Ontario Mining Act was directly due to the Cobalt boom.

To supply the mines with the compressed air needed for operating equipment underground, a unique plant was built at Ragged Chute, about 10 miles southeast of the town on the Montreal River. It uses the falling water to compress air which is carried to the mines through a network of cast iron pipes.

Ontario Hydro took over the plant in 1945, and it was the availability of cheap air which assisted many mining operations to open in recent years. On weekends, when the demand for air is reduced, surplus air pressure causes a huge spout of water

to shoot up more than 150 feet, and is a favorite attraction for photographers.

While the compressed air plant hasn't changed much since it was built in 1910, and has only broken down twice in all these years, a hydro-electric station is being built for Ontario Hydro at Lower Notch on the Montreal River, some 20 miles from Cobalt.

About \$69 million is being spent on the project, which will create a 3,500-acre headpond stretching 14 miles back up the river. Six hundred and eighty men are at present on the job, due for completion next year.

Cobalt fell upon hard times after the first world war. The price of silver dropped and Cobalt's miners dispersed around the world. During the depression, there wasn't a single mine operating. Cobalters were reduced to grubbing in the old mine dumps for specks of silver. Dozens of buildings were torn down and the population dropped to little more than 2,000.

The old town's luck began to change in the late forties and in recent years improved prices for silver have caused an upsurge in mining and exploration. The Cobalt Refinery, located just south of the town, developed an international reputation refining silver. It now processes about 20 million ounces a year from all parts of the world.

But while the mines picked up and there was a shortage of homes in the town, Cobalt still looked a pretty depressing place. It had lost many of its stores and the main street was lined with empty buildings.

In 1968, a new and aggressive council was elected under Mayor Jack Matheson. A car dealer, he had been forced to move his business to New Liskeard. But he kept his home in Cobalt.

The council embarked on a self-help program, building new sidewalks, installing mercury-vapor street lights, opening a new subdivision and building a downtown park. Instead of tearing down buildings





*In Cobalt's boom or bust days, business was transacted in the stock market building (left photo, in the background), in tents or just on the street. Huge water spout is from the compressed air plant built at Ragged Chute to supply local mines. Mayor Jack Mathews (above) is leading council in bid to attract tourists.*

This summer the town is staging a miners' festival. It is being organized by a committee headed by Father Leslie Costello, former player with the Maple Leafs and one of the stars of the Flying Fathers hockey team. Father Costello, the parish priest of St. Patrick's Church in Cobalt, has got the whole town working.

A major event will be a world championship mining contest. Invitations have been sent out to mining towns to send their best men, who will compete with drills and machines on the face of a rocky cliff. The festival is being strongly supported by other towns in the north and by the Ontario Northland Railway and the Department of Mines.

"Cobalt opened up the north for mining. Now we are going to open it up for the tourist business," says the mayor. He and his council are predicting that 10,000 visitors will flock to Cobalt this summer, bringing back the hustle and bustle of Cobalt's early glories. □

zed for taxes, they renovated and  
nverted them into apartments.

W an ambitious Cobalt restoration  
eme is under consideration. It was first  
ceived by Dr. Franc Joubin, the inter-  
onally-known geologist, who wants  
ee many of Cobalt's buildings preserved  
a section of the town converted into  
ing museum. The scheme has been  
proved by the province, but has been

blocked by the Ottawa freeze on urban  
renewal projects.

The council is also working to exploit  
the town's appearance and history by  
developing tourism as a secondary industry.

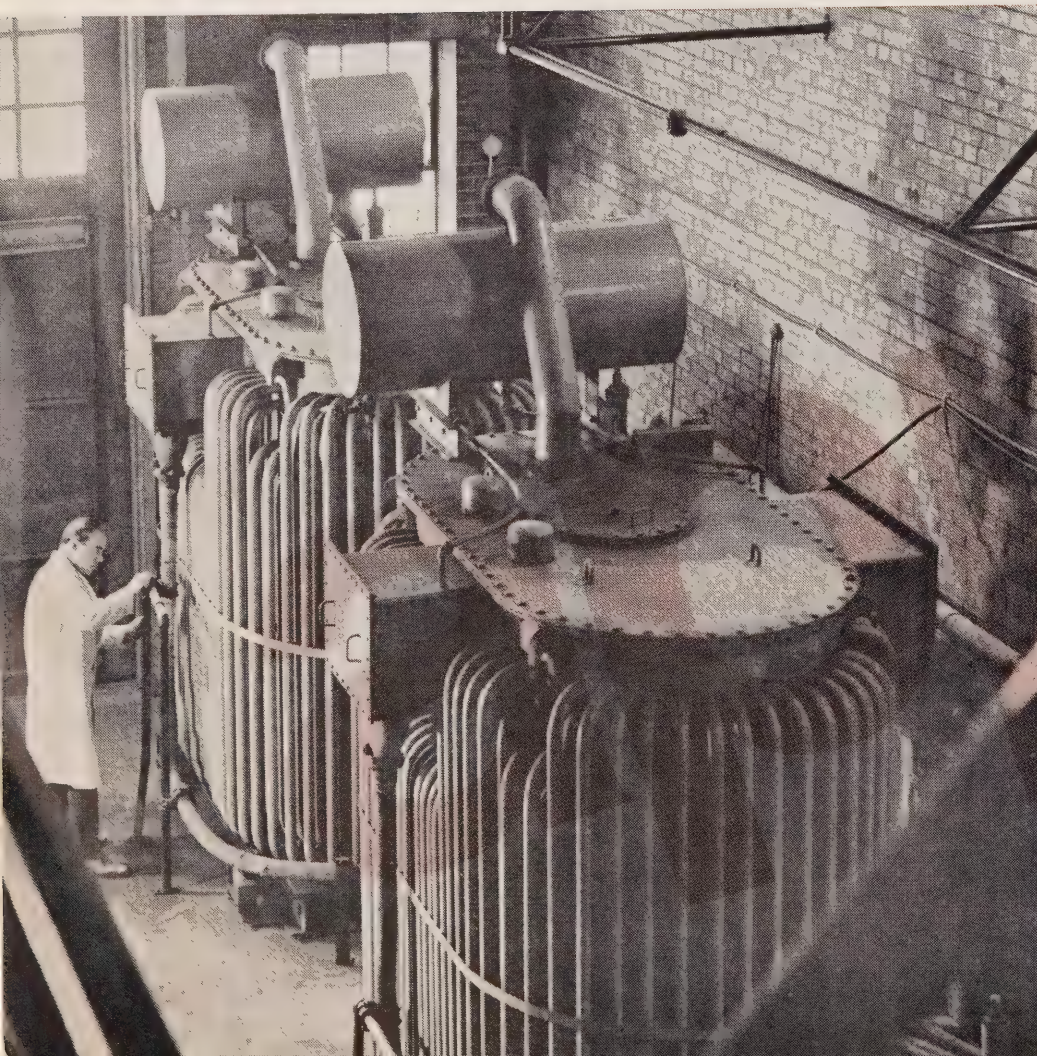
"Mining is our backbone, but we need  
something else to make jobs and keep our  
young people in the town," says Mr.  
Mathews.



**If the electric iron melts or the TV blows up, no one turns a hair. It's in the interests of safety, after all.**



by Susan Goldenberg



The electric iron had melted, the television glass had shattered and the air conditioner lamps, stove, washer and dryer were all on the blink. But no one at the Rexdale testing lab of the Canadian Standards Association was worried about this nightmarish turn of events.

Such destruction is not unusual in the CSA's daily battle to protect the public through testing the safety and durability of products used both in the home and industry. Its experiments weed out those items which either don't live up to claims about their life expectancy or, in the case of failure, are hazardous.

The CSA was formed in 1919 as a non-profit organization by a group of government officials and businessmen wanting national safety standards. And most of the CSA's 1,000 standards were requested by the manufacturers themselves.

"In this way, the consumer is afforded some protection by buying CSA-approved devices instead of unapproved items that might be suspect," says Eric Wilkins, CSA's manager of inspection services. "Also, many government agencies recognize the importance of compliance to standards and won't award contracts to firms lacking CSA certification."

However, the requirements of approximately 150 electrical standards must be met. They're backed by provincial laws which call for government approval of all electrical products sold in the province. In Ontario this task of approval is delegated to Ontario Hydro.

Normally, the CSA tests are made only on prototype items because, as Mr. Wilkins points out, "thousands of men would be necessary to have 100 per cent inspection."

"We have to rely to a certain degree on the manufacturers' desire for quality control," he adds.

As far as imported goods are concerned, testing in Britain and Europe is conducted according to CSA standards by two similar



Large transformers supply the current for the short-circuit testing of components at the CSA laboratories.



organizations – the British Standards Institute and the KEMA laboratories in Holland. American and Japanese goods – except for Japanese radios which are tested in Japan – are tested at the 100,000 square-foot Rexdale Lab. Smaller regional test laboratories are located in Montreal, Vancouver and Winnipeg for the convenience of clients across Canada.

CSA designs its own test equipment, much of which is worth thousands of dollars. Some of it is extremely ingenious. Lab technicians claim they can test just about anything. Rows of mechanical testers, for example, are used in an endurance test to turn light switches on and off 30,000 times – approximating normal life.

Electrical products tested run the gamut

from record players, televisions and radios to incubators, electric shavers, refrigerators, toasters, vending machines, washers, dryers, air conditioners, medical and dental equipment and even bowling ball cleaning machinery.

Non-electrical items cover such things as factory-built homes, plastics, fuel-burning equipment, plumbing fittings and fixtures, building products, and industrial safety equipment and apparel.

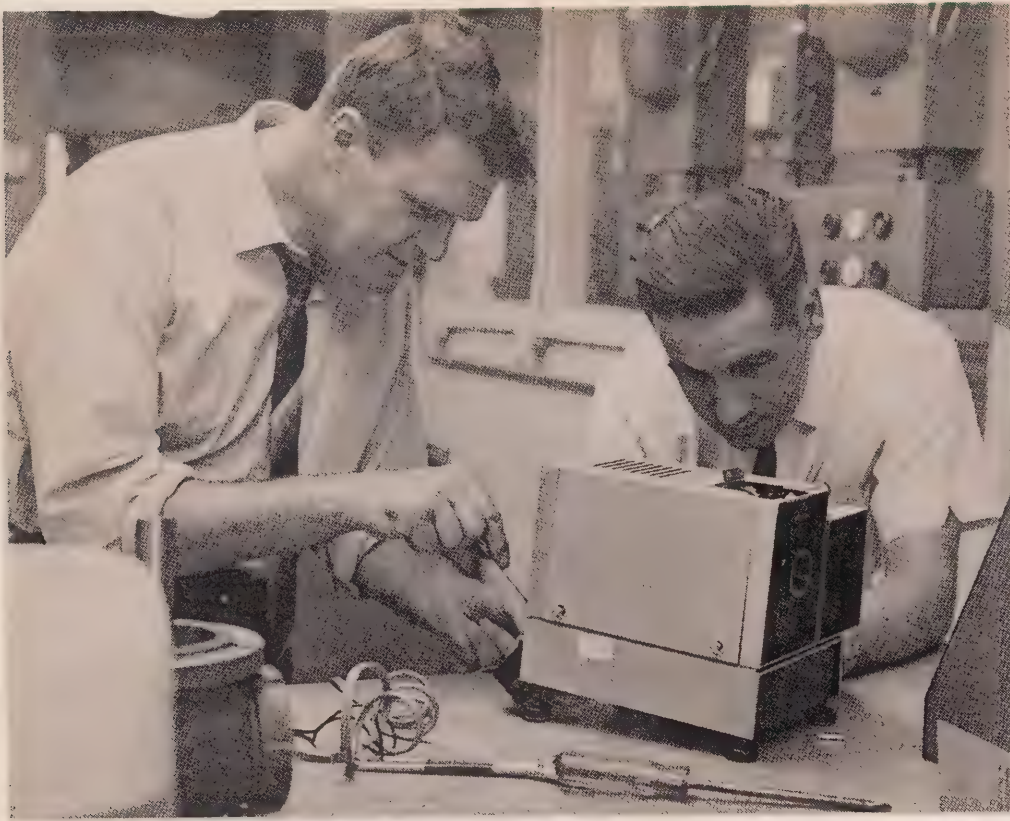
Even automobile safety comes under CSA scrutiny through the certification of seat belts and fixed reflective warning devices on the backs of slow-moving vehicles and portable ones for use on the highways by motorists in difficulty. A certification service for automobile tires has also been proposed.

The CSA tests concentrate mainly on a product's safety although performance often is considered, too. Normal conditions of wear and tear are simulated to ensure that the item can withstand them.

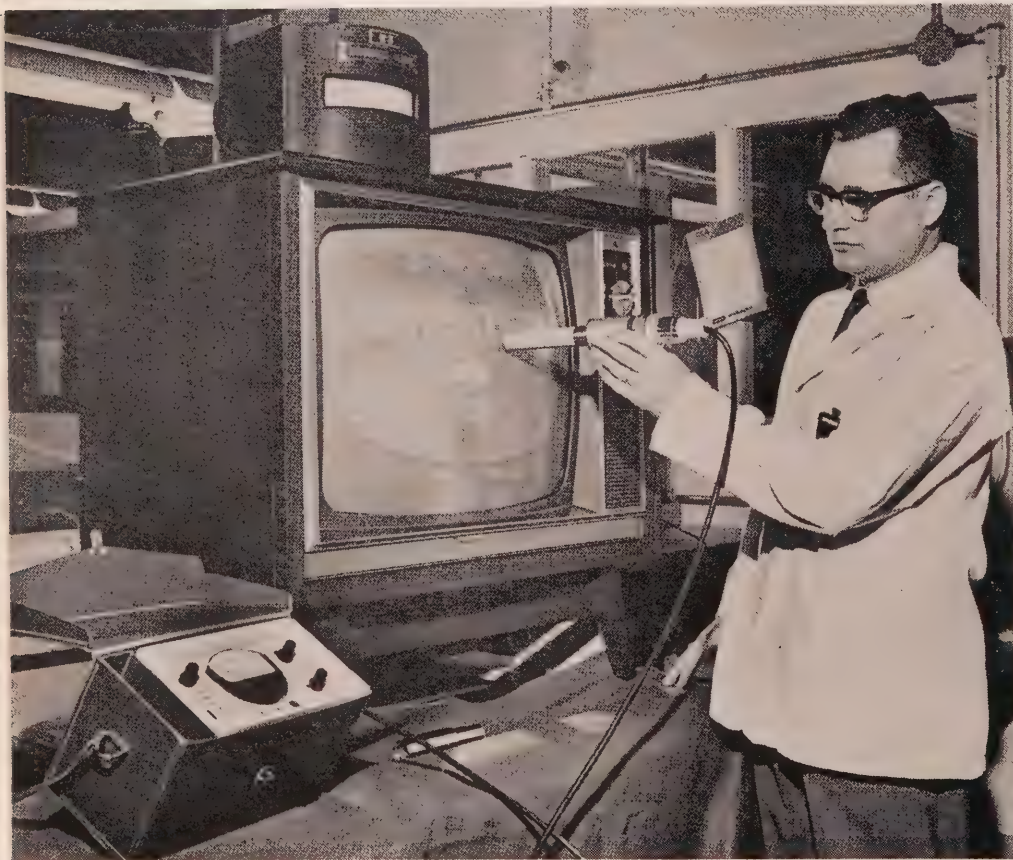
The electric iron, for example, was first tested to check whether it could withstand being dropped from an ironing board to a hardwood floor. Its cord was flexed 10,000 times – equivalent to 10 years' hard use – to check its durability. But, after passing these tests, the iron flunked the next examination because its thermostat proved incapable of withstanding the equivalent of 15 years' normal use. Poof! – and all that was left was its base, a sorry-looking, shrunken piece of cast aluminum.

Television sets get similarly harsh treatment.





CSA technicians examine an automatic slide projector while a color TV is tested for excessive radiation.



CSA tests in earlier years had demonstrated that the safety glass must be moulded to the picture tube if the glass were not to spray the room in the event of a tube cracking. Today, CSA technicians still break the glass on new models to ensure it will shatter only into the chassis. Color sets are checked for possible

excessive radiation. "We find that the amount of radiation is less than that from the luminous dial of a watch," says lab technician Ron Pogue.

Other tests include:

- Placing swimming pool fixtures in a huge pressurized water tank to make sure

there's no possibility of water getting into them. Two years ago, a Toronto student was electrocuted in a high school swimming pool. Hydro now insists that all pools have a special device to shut the power in the event of a fault before anyone can be harmed.

- Testing various types of thermostat 100,000 times to verify claims about their life endurance.
- Overloading washers and dryers to check whether they are safe.
- Checking the wattage of a rack of 50 light bulbs to see whether they meet their rating.
- Heating and cooling wire to extreme temperatures as well as artificially aging it to check its endurance.
- Dropping weights on construction hats to check their vulnerability to impact.

After such tests, the CSA either gives immediate certification, requests minor alterations or rejects a product. Certification is followed by periodic re-inspection at the factory and further tests at the lab to ensure continued compliance with the original standards of acceptance.

In the electrical field, the CSA is backed up at the retail level by Hydro's sales company inspectors, who check that all electrical equipment bears the CSA stamp of approval. "Our primary obligation in conducting these investigations is the safety of the public," explains Keith Bellamy, chief electrical inspector for Ontario Hydro.

But, as Mr. Wilkins says, all this watchful activity by the CSA and Hydro can only ensure the safety of products up to the time they are purchased.

"We can't prevent their being abused or misused although every effort is made to enlighten the public on the proper use of products," Mr. Wilkins says. "Human nature dictates that we can never have 100 per cent safety. Nevertheless, we're always striving for Utopia." □



# ***bold new beginning for Bigwin***

y Lois Lane

photos by Gary Smith







as the "Hot Tamale" and chugged just over a mile to the Lake of Bays. There they boarded the steamer that made innumerable stops along the shoreline before it reached their destination.

Greeted at the main dock, the weary travellers wound through covered walkways to register in the Rotunda or main lodge. They then went to their rooms, either in the Rotunda or the east or west lodges. In all, there was accommodation for 1,200 guests.

Structurally, the huge resort has changed little since the Bigwin Inn was built by C. O. Shaw between 1911 and 1920 at a cost of \$5 million. Mr. Shaw, who owned the Anglo Canadian Leather Company in Huntsville and Bracebridge, bought the Huntsville and Lake of Bays Navigation Company just after the turn of the century. He saw the advantages to Muskoka of a resort of this nature, which incidentally would support his steamship company. The island and the resort were

named after John Bigwin, a Rama Indian chief.

Today, the huge multi-sided dance pavilion still juts into the water, the boats still bounce in the waves in the marina beneath.

After a night's sleep, the guests would saunter down to the main dining room, which extends over the lake. It could take 750 at a sitting and kept 95 waitresses on the hop during the season. After breakfast, older guests would wander back to the Rotunda, where the huge lounge boasts 10 magnificent fireplaces.

They came from all over North America. Old friends would meet in the lounge to gossip about the year gone by and speculate on the year ahead. Men would wander into the barber shop, stopping at the valet service en route. Their women might drop into the beauty parlor, picking up a favorite magazine at the newsstand and gift shop.

Meanwhile, the younger and more

It's now only a short two-hour drive from Toronto to Bigwin Island, near Baysville. Not too long ago the journey took all day, yet the well-to-do arrived in droves at the Bigwin Island Hotel — then the largest resort in the British Empire.

They took the train from Toronto to Huntsville, transferred to a steamboat and sailed across Fairy Lake and Peninsula Lake to the Portage, climbed upon the tiny, narrow-gauge railway affectionately known



*Eighty-foot disused water tower provides a fine observation point for the whole of Bigwin Island. Among the resort's other prominent buildings are the Rotunda (centre) and the old dance pavilion.*



energetic set would have headed off to the huge swimming dock, the tennis courts, the golf course, or the stables. The Lake of Bays Yacht Club was located on the island and guests could learn to sail there.

The weekend bustled with activity. The dance pavilion would sway to the latest thing this side of New York and people would come for miles to rub elbows with the Establishment.

But the highlight was the Sunday evening concert in the Rotunda. "I remember going with others of my family to these concerts at Bigwin," reminisces Robert Boyer, MPP for Muskoka. "Mr. Shaw was a very competent trumpet player and very occasionally he was persuaded to take part in the programs. Some noted artists were heard and the concerts were in aid of The Star Fresh Air Fund.

"During the first world war, Mr. Shaw organized some of his employees into a band. They called themselves the Canadian-

Italian Band. About 1919, Herbert L. Clark became director of what then became known as the Anglo-Canadian Band, which toured the country. This band was one of the attractions at the Canadian National Exhibition until the 1930s."

Since Mr. Shaw's death in 1945, the resort has been sold a number of times. And it seems each owner has encountered the same problem . . . how to keep this multi-million dollar operation afloat.

The latest owners, a group of Toronto business and professional men calling themselves Bigisle Enterprises Ltd., have hit on an idea which may not only restore some of the old-time elegance, but give pride in ownership as well . . . for Bigwin has gone condominium.

The apartments will be owned by the residents and the usefulness of the main building will be spread year-round. The present complex consists of the four main buildings: the dining room, the

Rotunda and the two lodges.

The present apartment units — bachelor and one-bedroom — are located in the east lodge. Here, as part of a \$1 million facelift, the old interiors have been torn out and converted into electrically-heated low-ceilinged suites complete with kitchenettes, modern tiled bathrooms, broadloom, television outlets, provision for air-conditioning and individual electric water heaters.

Anyone remembering the old lodges would be amazed at the transformation.



The solid concrete walls of the halls have been plastered and covered with wallpaper. Stained woodwork and stucco have converted the drab exterior into elegant Old English Tudor.

"Our present plan is to convert the two main lodges into condominiums," says manager Albert Agnelli. "We have 77 units in the east lodge and will have 53 in the west lodge by this fall." But this is just the start. The firm plans to erect 600 units around the island, giving a building density of one acre per family.

The owners see the apartments being used as retirement homes or as a substitute for a cottage. "We have complete restaurant facilities," says Mr. Agnelli. "But families are free to do whatever they wish. They can cook light meals on their own premises or eat here."

Condominium owners (the prices of units range from \$11,000 for a bachelor to \$18,700 for a one-bedroom) have already elected a board of directors to look after and maintain the community property. In addition, all owners and a number of Lake of Bays cottagers have been granted membership in a country club known as the Bigwin Island Community Club.

Bigisle Enterprises are attempting to bring Bigwin back to its days of former elegance, but with a more modern approach. Once the wealthy arrived by private railway car or yacht. Now a 3,000-foot airstrip services the island, enabling the new owners and their guests to arrive by private plane while a small air service from Toronto will take up to six passengers to the island for \$15 on Fridays, Saturdays and Sundays.

"The island has also become more accessible in the winter," says Mr. Agnelli, who lives there year-round with his staff of 30. "Snowmobiles proved ideal for transportation over the ice last winter. But rough water in the fall and the spring break-up are problems and we are considering the use of hovercraft."

Bigwin will also sport a fine ski run this winter. A hill behind the main lodges, near the old water tower, has been cleared and T-bars and a chairlift will be installed.

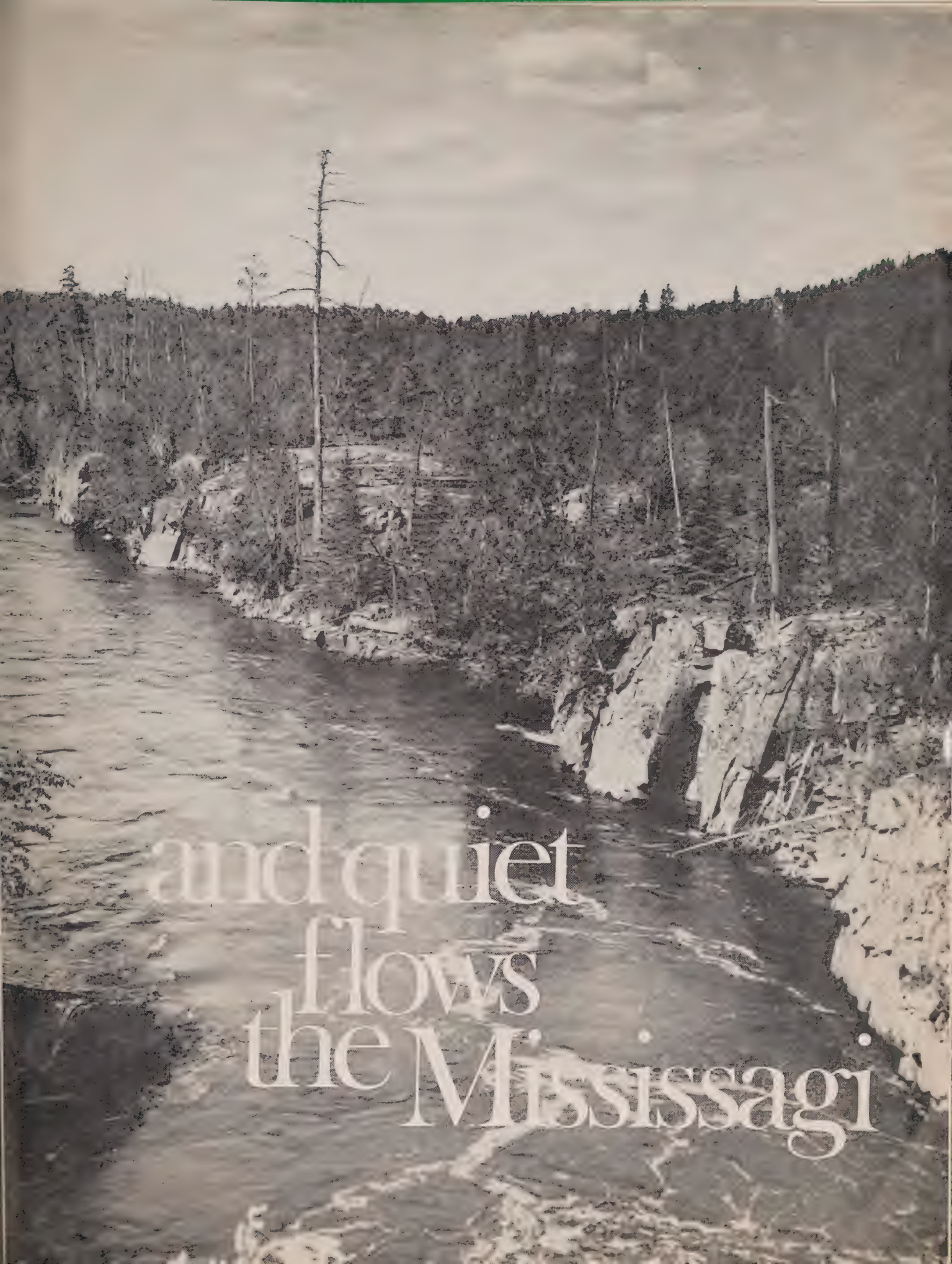
Has Bigwin set a precedent in Ontario resort ownership? Some won't admit it, but there's no doubt that lodge owners are facing stiff competition from camping and cheap fares to Europe and Asia. Other lodges — Limberlost, near Algonquin Park, and Hidden Valley resort, near Huntsville — are changing over to country club membership.

Certainly, the pattern is changing and the Bigwin Island's condominium concept may be one route to renewed prosperity. □



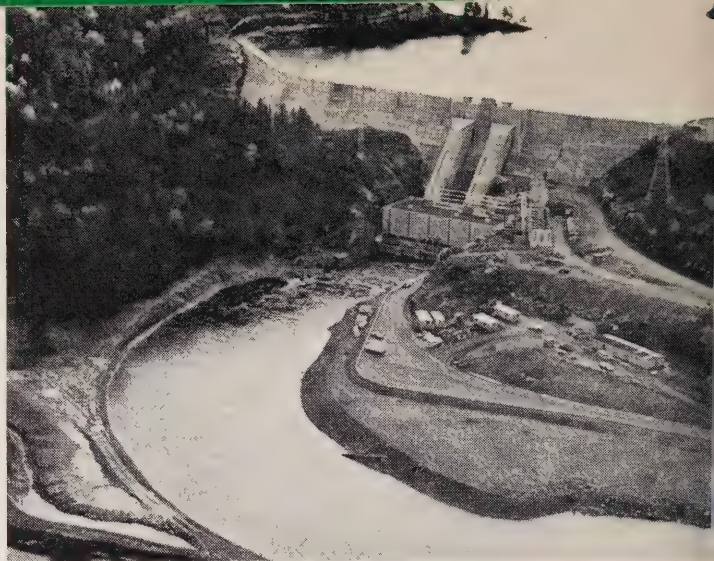
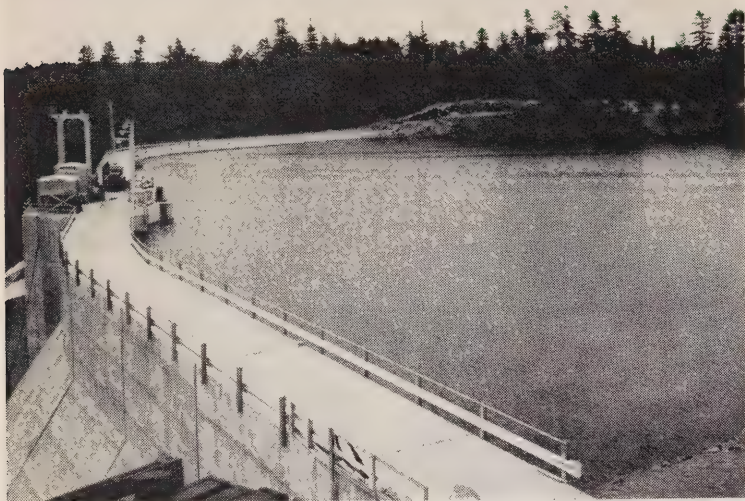
*Kitchenette permits the preparation of light meals in the condominium units. Main buildings in the complex are linked by covered walkways.*





and quiet  
flows  
the Mississagi





All's quiet on the Mississagi.

No telephones ring at Chub Lake colony anymore. The kids are gone. So are their parents — and their homes. The cranes, trucks, bulldozers and cement mixers have been dispatched elsewhere. Once again the 138-mile river winds its way peacefully through the wilderness to Lake Huron.

Behind them, construction workers have

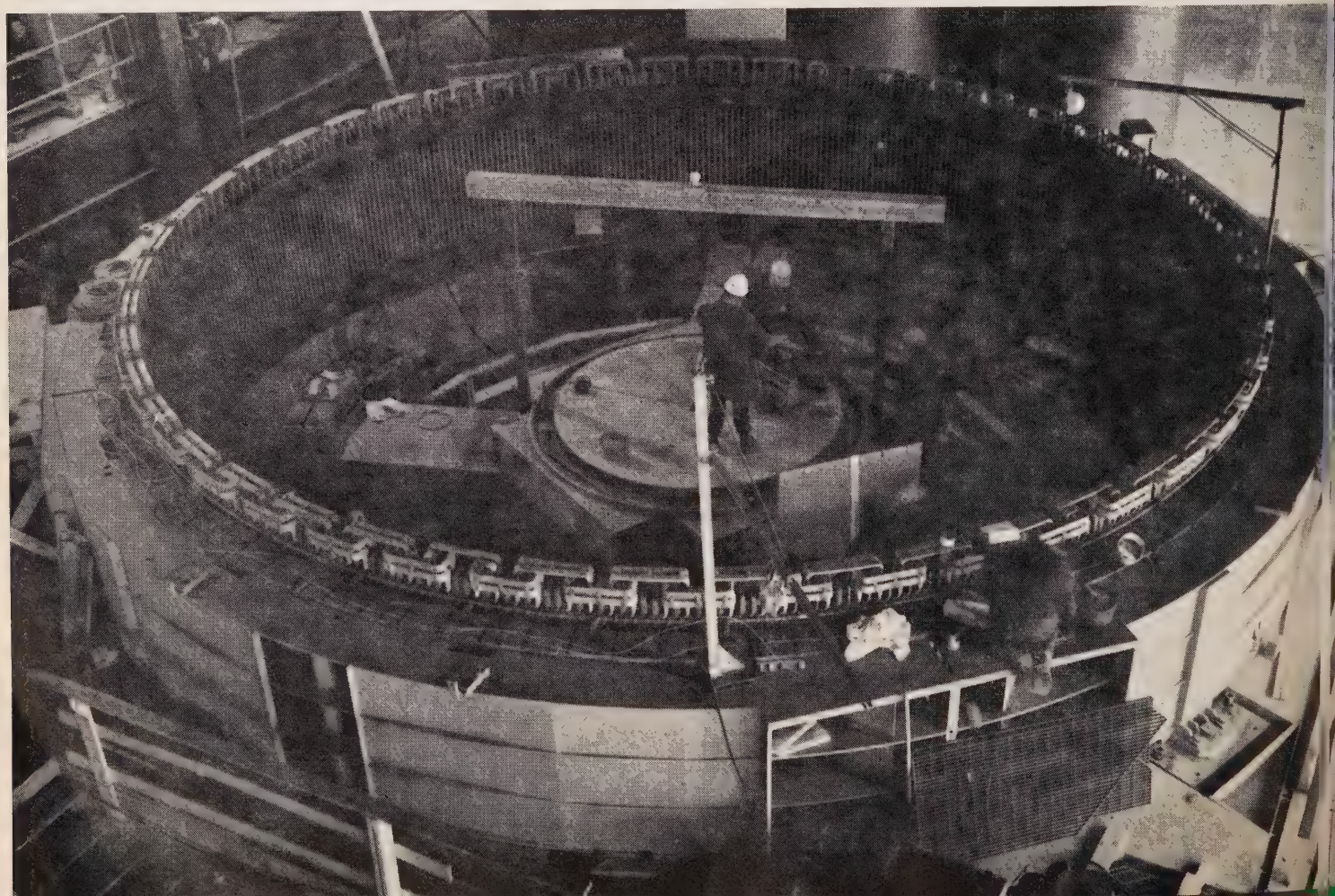
left four hydro-electric generating stations, silent edifices erected over a quarter-century to feed into the province's power grid.

Construction crews first converged upon the Mississagi shortly after the second world war to build the 42,300-kilowatt George W. Rayner generating station. By 1950, the plant was hooked into the transmission network serving northeastern and southern Ontario.

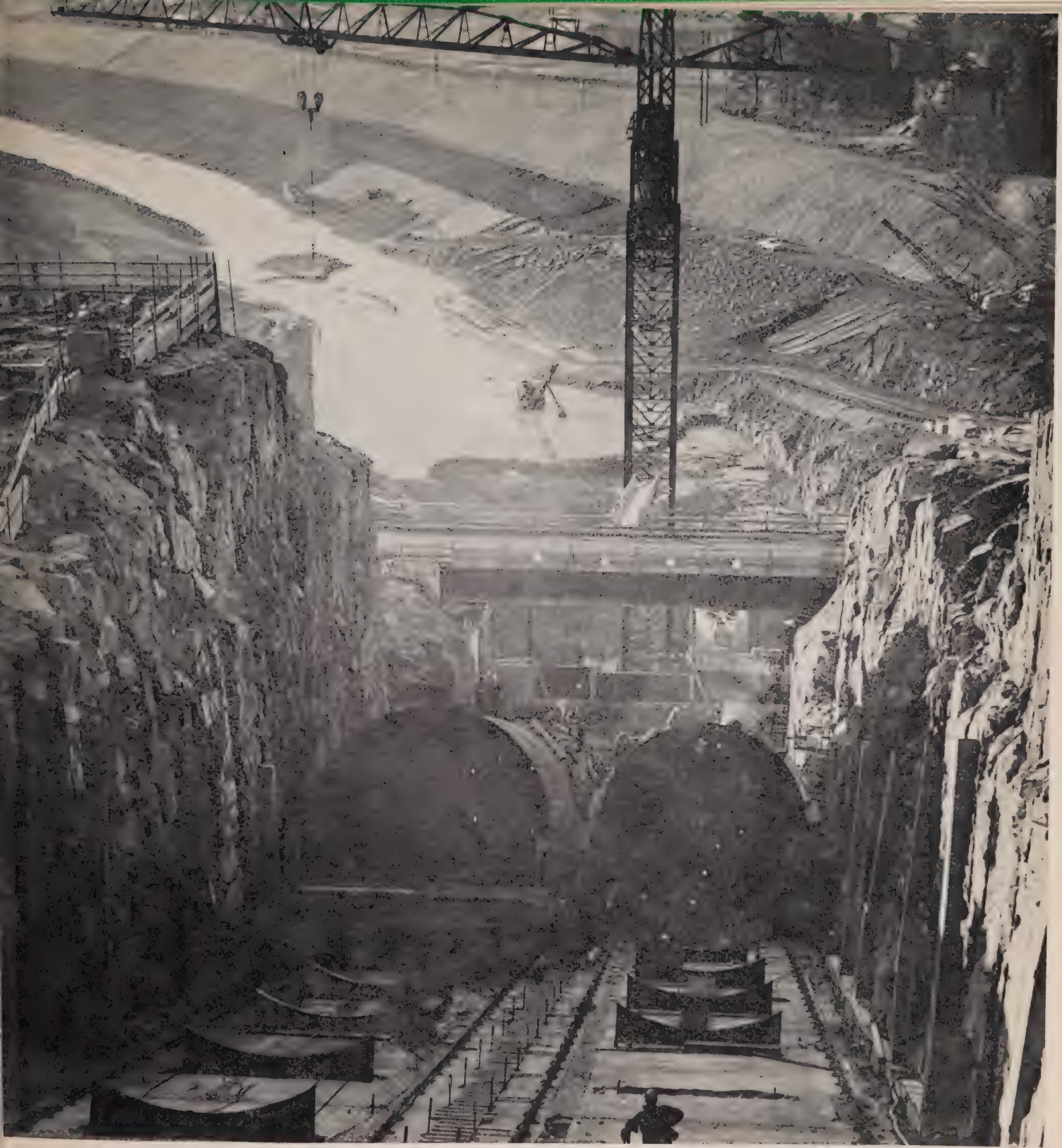
A decade later and another similar-sized station — Red Rock Falls — became the second plant to tap the river as it drops nearly 1,000 feet through remote lakes, innumerable rapids and waterfalls from watershed to mouth.

Six years went by then the men and the machines were back on the Mississagi build two more stations. They also built themselves a thriving community in a

*The views of the Aubrey Falls station (above) show the headpond, the main dam and the river below. Huge generating units and penstocks are seen during installation at Wells generating station, further downstream.*







utiful peninsula setting between Chub  
Jobam lakes.

with the completion of the 130,500-  
watt Aubrey Falls plant, the town with  
refabricated homes, cafeteria, hospital  
recreation buildings has been dis-  
titled. This year also sees the completion  
Wells, a new 203,300-kilowatt station  
to the Rayner plant.

of the foremost considerations in

the development of Aubrey Falls was  
preservation of the cataract's natural  
splendor. In fact, Ontario Hydro has guar-  
anteed that water will continue to spill  
over this outstanding tourist attraction  
during the daylight hours of the tourist  
season. And upstream from the falls, the  
headpond forms a six-and-a-half-mile  
artificial lake.

Wells is about 900 feet west of Rayner.

But apart from sharing the same headpond,  
they're entirely independent stations.

One of the most unusual aspects about  
Wells is the length of the tailrace channel  
that returns water to the river. It measures  
well over half a mile.

All four plants will eventually be remotely  
controlled from a new transformer station  
named after the picturesque river. All,  
indeed, is quiet on the Mississagi. □



*Hard work and an open air life create hefty appetites and construction forces ate well at the Chub Lake community. View of Aubrey Falls from below the main dam gives some idea of the station's picturesque setting.*







# with management in mind

Photo: Imperial Oil Ltd.

Bathed in vertical strings of light, the fractionating towers of Sarnia's petrochemical industry pierce the night sky. It was amid the refineries and plants that depend so much on large amounts of electric power that members of the Association of Municipal Electrical Utilities chose to meet for their summer conference. And management was their theme.



## utilities 'must believe in product'

Perhaps the most important reason for Ontario Hydro and its associated municipal utilities to operate a marketing program is that an electric utility has to believe in its product and be promotionally-oriented to be customer-oriented, says D. J. Gordon.

Ontario Hydro's general manager told a crowded luncheon session that marketing does, indeed, have a payoff for the customer.

"Records indicate that utilities improving their load factors in recent years have reduced unit costs. And utilities with higher consumptions per customer provide service at the lower cost per kilowatt-hour," Mr. Gordon said.

But he suggested that economics and general statements do not satisfy today's critics of the Hydro system. "The environment in which Ontario Hydro and the municipal utilities are operating has changed," he said. "It's an environment pregnant with challenges and problems. We're operating in a different league now — a bigger league, and a more sophisticated one, too, but a league where the owners, players, and the fans are a little edgy.

"Until quite recently expansion and growth were looked upon with unqualified approval as desirable ends in themselves. They were evidence of health in the economy. They provided more jobs and a promise of more abundant living to the entire community. Growth to us in electric utility marketing has meant that we were searching out and serving the needs of the community for a vital service. By increasing our volume sales we were lowering the cost per kilowatt-hour of our product, electricity, to the ultimate customer," Mr. Gordon said.

However, he added, the validity of this position as far as the electric utilities are concerned is now being seriously challenged, "not so much at the retail distribution level but at the wholesale, which is the Ontario Hydro level."

People, Mr. Gordon pointed out, have questioned the wisdom of marketing by electrical utilities in today's environment and in the face of air pollution. "But," he said, "isn't it an anomaly that here we are with the safest, cleanest most efficient and most flexible source of energy and people are saying desist in the promotion of this product in order to ameliorate the pollution problem?"

"I would suggest the reverse is true. A million electrically-heated homes supplied by a modern power station with a 700-foot stack equipped with effective air-quality control devices, or supplied by a nuclear power station, are more beneficial to the environment than a million homes emitting smoke, soot and noxious gases at roof-top level in a congested city."

Mr. Gordon said a Federal Bar Association report from Washington noted: "One problem lies with the unfortunate fact that many of the prime movers in the environmental upheaval are people who nurse a revolution against the life style we have come to accept . . . and are particularly hostile to business and industry and blame this sector of society for too much progress, too much materialism, too many gadgets, in short, too much civilization.

"If we stop generating electricity people will stop buying appliances; if we stop building highways people will give up automobiles; if we shut down smoking, stinking steel and smelter plants then there won't be any metal to make anything and the environment will be spared on a thousand fronts," the report continued.

"There is a large influential body of conservationists, editorial writers, liberals and academics who want to get us all back to Thoreau's pool. If they succeed, that pond had better be full of fish because there are going to be an awful lot of people awfully hungry.

"Whether we like it or not, the economic machinery of the country and the world is bigger than we are, and throwing too big a wrench into it too quickly is going to result in nothing short of disaster!" it added.

"Marketing," Mr. Gordon said, "is more than just selling. It's a philosophy of business, not an on again, off again activity. It's a vital part of the operation of business. Ontario Hydro and the municipal utilities if our customers are to receive the type of service to which they are entitled and treatment they deserve."

He concluded with the conviction that there is a need for a continuing, selective, well-planned and well-executed marketing program — even in today's environment.

## pay-as-you-go streetlights police urged

Municipal officials in North York won't be satisfied until people flying over Metropolitan Toronto at night can recognize the borough by its streetlights.

Traffic Commissioner Sid Cole told a streetlighting seminar that no municipal lighting renewal program can be planned for termination at any given time. He said the process of continued improvement will go on, and does, go on indefinitely.

A former Metro policeman whose specialty was traffic, Mr. Cole said the primary reason for streetlighting is safety, not illumination.

And he advocated a "pay-as-you-go" policy to achieve proper lighting for municipalities. He said that in North York one-half of one mill of the tax rate goes toward the borough's streetlighting program.

"In the past 10 years we've spent about \$3 million on streetlighting, either in new installations or in replacement of obsolete



equipment. Happily, we don't owe a dime for our streetlights so that's the advantage of a go-slow program over a crash program. We tried it the other way with our sidewalk program and now we're paying as much in interest charges resulting from the crash program as we are paying for new sidewalk construction.

"We've also made it a condition of our subdivision agreement that all new subdivisions in the borough must have streetlighting installed to minimum standards developed by North York Hydro," Mr. Cole said.

He said at present the borough is installing mercury-vapor lighting exclusively and will be replacing obsolete equipment with the same light source.

"When essential services are taken into consideration by any municipality, streetlighting must be given one of the top priorities," Mr. Cole said.

Ontario Hydro's director of consumer service, E. Grant Bainbridge, called for the ownership of streetlighting assets by the municipality rather than by the utility.

Mr. Bainbridge said Hydro's records show that 96 municipalities out of 353 have already persuaded the corporation to take over ownership of the streetlighting assets "with obvious relief and advantages to both corporation and utility."

Outlining some of the economic advantages to the utility not owning the streetlighting facilities, he said there is no longer need to maintain a streetlighting capital account on the books, no need to keep a streetlight depreciation reserve nor calculate annual depreciation charges to the corporation.

Also eliminated is the need to calculate and bill annual financing charges and worry about how much the utility has subsidized the streetlighting if equipment is obsolete and ordered retired before fulfilling its lifespan.

Charges to the municipality owning the streetlighting will consist of only two components. These are the supply of energy and the actual costs of operation and maintenance incurred by utility staff and equipment.

"Utilities who own the streetlighting facilities have become middlemen providing funds chargeable to the customers that should be provided by the ratepayers," Mr. Bainbridge said.

He said that by owning the streetlighting system the utility must recover the cost of energy used, the cost of operation and maintenance of the system, the capital cost of the system and, with continued ownership vested in the utility, it must replace the lighting system as it wears out and therefore must charge the corporation with depreciation.

Reduced traffic accidents, crime prevention and business promotion, said E. L. Burnham, Belleville Utilities Commission manager, are the chief reasons for installing streetlighting. He urged delegates to "make allies," such as the traffic or police department, merchants and citizens generally in the promotion of improved lighting for municipal streets. □

## bargaining • call for united front

Ontario Hydro has called upon the municipal utilities to put up a united front during contract negotiations.

Gordon M. McHenry, Hydro's director of labor relations, told AMEU delegates that Hydro has a direct interest in working with the municipal utilities to achieve this end.

Mr. McHenry said the "whipsawing" effect — the playing of one utility against another by the union — is "very real and works to the detriment of every utility in the collective bargaining process."

He added that it is important to recognize that while a union is pressing a utility to improve vacations, holding up another utility as an example, it may be pressing the second utility to improve sick leave, holding up the first utility as an example.

A first step in correcting this situation, he said, would be to co-ordinate bargaining

through a better exchange of information.

A further step, Mr. McHenry suggested, might be to utilize a common bargaining agent or chairman for all utilities who are negotiating with the same union representative.

"And a final step might be complete coalition bargaining, perhaps under a system along the lines which the construction industry hopes to achieve," Mr. McHenry added.

He said that the most significant thing in the field of labor relations at this time is recognition that high wage demands are now the fundamental basis of inflation of the economy.

"Economists speak of demand-pull inflation and cost-push inflation. Demand-pull inflation results from excessive demand by consumers of all sorts which leads to expansion of facilities to meet these demands. Such expansion itself generates increased demand. It's a vicious cycle. Demand-pull inflation has been broken, apparently, since consumer demand is down. US factories have been operating at 80 per cent of capacity, the production index has risen only 0.2 per cent in 16 months.

"But the wage demands of unions and the actual wage and salary increases have continued at a very high level. Now we have a cost-push inflation, a continued rise in costs and upward pressure on prices resulting from those high wage settlements," Mr. McHenry said.

Noting a stiffening of government attitude on wage and salary demands and the proclamation of wage guidelines, he said: "If this action was limited to our own government, its validity might remain in some doubt. But this is not the case. A similar trend has developed in the US, and there's even been talk of wage controls in the UK.

"Politically, our government appears to be on sound ground in proposing wage guidelines. A recent public opinion poll showed 50 per cent of the Canadian people identifying labor as the key obstacle to control of living costs. Even 41 per cent of the union members polled agreed with this and only 29 per cent of the people polled



blamed big business.

"This support from government is most important to employers in all categories. The major sickness in labor relations in recent years has been a swing of the power pendulum far over to the labor side," Mr. McHenry said. "And the basic problem for the municipal utilities," he said, "is the growing strength of two unions, CUPE and IBEW, opposing a large number of relatively small employers."

Mr. McHenry cited the construction industry as an example of the most extreme breakdown of the collective bargaining process. "The very large settlements in that sector of the economy are setting the pace for everyone else."

While he agreed that province-wide bargaining might be one answer to the utilities' contract problems with the unions, Bruce Prentice, Toronto Hydro's assistant general manager, said: "At present, that seems as remote as province-wide rates."

Mr. Prentice, who heads the AMEU's employee relations committee, said the group is not anti-union, anti-government, anti-establishment, or anti anything else. "These are luxuries we can't afford. We are pro-management and are trying to help raise the level of management knowledge and expertise in the employee relations area."

Pointing out how whipsawing affects all utilities, Mr. Prentice said that if the manager of a small utility decides to grant his employees four weeks' vacation after one year of service, "you can be sure we'll all be affected on the next round of contract talks."

"If you ask him gently how come, he'll tell you: nobody in his utility was affected; the union was insistent without necessarily supporting their demand with fact or logical argument; there was no thought of going to conciliation or beyond or there was a lack of experience at the commission level."

"These kinds of unwarranted give-aways affect every utility and ultimately are reflected in our costs, and in our rates. In addition, they affect directly the employees of any other utility."

"The only approach giving any hope of

success for the utilities involved in the collective bargaining process is for each manager to apply diligently and intelligently the same basic techniques to employee relations that he bends to any other problem.

"Work at it, study it, examine it, get all the help you can and try to find standards that work and apply them consistently," Mr. Prentice urged delegates.

## lousy listeners

Society generally is not a good communicator, says R. C. Tremblay, general sales and marketing manager of the 3M Company, "because most of its members are lousy listeners."

In a humor-packed dialogue on business communications, Mr. Tremblay said one of the greatest problems facing industry today is the illusion that communication has been accomplished.

While he agreed that tremendous strides have been made in the communications field over the years, he said verbal communication is still the most important, and most overlooked, means of getting industry's message across.

"Sure, computers have created a brand new language and a new way of thinking in the space age. But all the computers across the country still only run at 30 per cent of their capacities," Mr. Tremblay said in stressing the importance of verbal communication.

However, he cautioned, verbal communication must be a two-way street. He said every speaker must also be a good listener. "Maybe there wouldn't be a generation gap if both groups had taken the time and interest to have communicated," Mr. Tremblay added.

Proof, he said, of the significance of verbal communication in today's highly-automated society is the Washington-Moscow hot-line, a device through which the two world powers talk out their prob-

lems and which will likely be the means by which a third world war will be prevented.

And he agreed with a statement by Marshall McLuhan that today we do live in a global community.

He urged delegates to tell their full story, then "shut up and listen to other guy."

"Communicate with people you work with, with people who work for you, with the people you work for. Remember that in our country we do have freedom of speech, so use it. But by all means let other guy use it, too," Mr. Tremblay said.

## new president

W. M. Hogg, president of Great Lakes Power Company Limited, of Sault Ste. Marie, was elected president of the Electrical Utilities Safety Association at its annual meeting held in conjunction with the AMEU summer conference.

He succeeds W. R. Pfaff, manager of Catharines Public Utilities Commission.

B. G. Kirstine, of the G. M. Guest Company Limited, Toronto, was elected vice president.

Directors named include: J. B. Anon, Oshawa PUC; C. I. Bacon, Cornwall Standard Railway, Light and Power Company; Fee, Kingston PUC; N. A. Grand, Brantford PUC; H. W. Little, Brockville PUC; D. M. Seath, Stratford PUC; Miller, Dunnville Consolidated Telephone Co. Ltd.; M. H. Kelly, Atikokan Hydro; C. S. Phelps, Sarnia Hydro; W. H. Porter, Peterborough Utilities Commission; Schmidt, Muskoka and Parry Sound Telephone Co. Ltd., and J. A. Torrance, Electric Hydro.

A highlight of the meeting was a presentation to Borough of York Fire Department reader Alfred Stevens of a plaque commemorating his resuscitation of a person found unconscious in a parked car.



# along hydro lines

## Return of the radial

Radial railways are making a comeback — as a curiosity, at any rate. A group of radial and streetcar buffs who belong to the Ontario Electric Railway Historical Association are turning the old Toronto and Guelph electric railway right-of-way into a radial railway and adding a streetcar museum. To date, they've collected 15 streetcars and electric railway cars that once travelled Toronto streets and the Ontario countryside. □

## Technology cuts costs

Technological advances in submarine cable construction and installation will make it less costly for Ontario Hydro's island customers to get electrical service. The lowering of prices for submarine cable has enabled Hydro to waive its requirement for double the normal number of customers to a mile of line for water-crossing circuits. Coincident with the double-density change, Hydro will now assume ownership of the customer's portion of a submarine cable. Until now, island customers usually were responsible for ownership and maintenance of portions of submarine cables. With the change they will be assessed the installation cost and a prepaid maintenance fee. Hydro will then assume maintenance and replacement responsibility. The most common cause of submarine cable failure is ice wear at the shorelines, while boats dragging anchors also do their share of damage. □

## More for our money

The federal government's decision to free the Canadian dollar to find its own value on world markets is expected to cut coal costs at Ontario Hydro's thermal stations. While it has not yet been determined how much the price of imported US coal will drop, it will have some effect on operating costs. The same applies to imported equipment — Hydro will get the same amount of money. Until the government's decision to free the dollar, it was pegged at 2.5 cents to the US dollar. In the first few days after the government's action, the dollar fluctuated between 94 and 96 cents, making the Canadian dollar more valuable in comparison to other world currencies. Another advantage to Ontario Hydro of the unpegged dollar is the reduction of foreign long-term debt in the form of bonds and ventures floated in the US or elsewhere. Since the dollar is now higher, Hydro has to pay back less in terms of US dollars. □

## Campsite power

All the comforts of home will be available to Sibbald Point campers this summer.

The Ontario Department of Lands and Forests is installing electrical outlets for campsites at the Lake Simcoe provincial park in response to growing demands by vacationers for "more for their money."

Available to campers for a small fee, the electrical outlets will permit the modern camper to enjoy his wilderness vacation with many of the comforts of home such as electric blankets, television and lights. □

## Condenser contract

An Ontario Hydro contract worth about \$1.8 million has been awarded to Foster Wheeler Limited of St. Catharines for steam condensers at the \$303 million Lennox generating station at Bath, 20 miles west of Kingston.

Lennox will be Hydro's first oil-fired thermal-electric plant. It is due to deliver first power in 1974. □

## Hydro homes

To combat a chronic housing shortage in the Port Elgin area, Ontario Hydro has signed an agreement with a firm of developers for an apartment complex to accommodate workers at the Bruce nuclear power development.

The influx of staff for the Bruce project will make the housing situation more acute than it already is, and of particular concern is the expected arrival of 400 workers who will bring the heavy water plant into operation over the next two years.

Ontario Hydro will guarantee the owners full occupancy of the 64 apartment suites for a 10-year period. Additional suites may be constructed if required.

Apartments will be available to personnel either on a permanent basis or as temporary accommodation while their own homes are being completed. □

## Introducing the scrubber

There's still a long way to go in finding a solution to the problem of sulphur dioxide removal from flue gases at Ontario Hydro's coal-burning stations, but the answer may be a lot closer with the development of a device known affectionately as "The Scrubber."

Named after the chemical process it utilizes, the machine was created and built by a team of Hydro scientists and technicians headed by Doug Harrison and Dr. Abdus Saleem. Tests of the prototype are now underway at the R. L. Hearn generating station on the Toronto waterfront.

The scrubber works on the principle of the chemical reaction of limestone (calcium carbonate) with unwanted sulphur dioxide to form calcium sulphates and sulphites. The reaction takes place in a limestone slurry before gases from the furnace enter the smokestack.

Dr. Saleem is confident of the experiment's outcome. "At least," he says, "we'll know where the sulphur is. After going through the machine it's harmless and easier to handle."

But the process does create a subsidiary problem.

"We expect to use about 160 pounds of limestone for each ton of coal," says Dr. Saleem, "so adding the sulphur residues to the fly ash we already get will more than double our disposal problem."

However, the research team is working on that angle, too. "Eventually, we may loop the whole process," Dr. Saleem says. "Then the limestone would be recycled and use made of the by-products." □



## Hearn to burn gas

Natural gas will soon be burned in place of coal at the R. L. Hearn generating station on the Toronto waterfront. Work is expected to start immediately as plans call for the first units to be fuelled by natural gas by next spring and the conversion to be completed by the end of 1971.

The conversion, part of Ontario Hydro's pollution control program, will involve a capital expenditure of \$4 million, and the station's fuel costs will rise by more than \$8 million annually. The project is dependent upon Trans-Canada Pipelines and Consumers' Gas completing the construction of the necessary facilities.

Hydro Chairman George Gathercole says that four units will burn gas exclusively. This represents a third of the 1,200,000-kilowatt plant. Hearn accounts for about one-tenth of the system's present capacity.

Part of the natural gas supply will be interruptible. Because of this, coal will be burned in the other four units when gas is not fully available. The partial use of coal, which is less costly than natural gas, will help to moderate the rise in cost and also provide a hedge against contingencies such as a gas pipeline breakdown.

Mr. Gathercole emphasized that the use of natural gas is not a panacea for all pollution problems or situations. Nor is it expected that it will be applicable to other thermal plants. While natural gas is low in sulphur dioxide, it does contain another contaminant — nitrous oxide. □

## Long time, no see

Hydro's municipal accountants got together recently — for the first time in 15 years. Planning for the future was the dominant theme of the meeting.

The changing role of the municipal accountant received special treatment from the various speakers while during "think tank" sessions the group concentrated on such problems as financial reports, billing and accounting procedures and administrative responsibilities.

Oshawa PUC's secretary-treasurer Bill Gibbie outlined the services that municipal accountants could provide for the utilities, and Ontario Hydro's assistant general manager — finance, Harold Banks, discussed the involvement of the accountants with regional government. □

## A bargain

To call Ontario Hydro a cheap outfit, providing you're talking about the cost of power, is quite a compliment. Recent statistics show that the consumption of 250 kilowatt-hours a month in an Ontario home early in 1969 cost less than the same amount of power anywhere in the United States. At the 750 kilowatt-hour per month level, only Tennessee and Washington State had cheaper rates.

At \$4.53 for 250 kilowatt-hours per month, Hydro's rates were cheaper than those even of the Tennessee Valley Authority — the largest public utility in North America. Highest rates in the US are in Alaska, at \$10.12 for 250 kilowatt-hours per month. New York State followed closely at \$9.02 for the same amount of power. □

## Challenge for the '70s

Utilities must continue to work for sustained, sound economic growth that enhances material well-being and also preserves the

quality of the environment, said Ontario Hydro Chairman George Gathercole.

Speaking at the official opening of Waterloo PUC's Howard Scheifele transformer station, Mr. Gathercole said many of the decisions that are now being made will have their effects generations from now, "just as the decisions made by your forefathers who moved here years ago had on what is happening today."

The Howard Scheifele transformer station is one of the most modern in the province, and it's the first municipally-owned station in the province receiving power directly from Ontario Hydro's 230,000-volt grid.

Mr. Gathercole said mention of the year 2000 makes it "sound like something out of science fiction — but it's really only 30 years from now. Your children will be working and developing their own careers. They'll be raising their children and perhaps wondering what the 22nd century will bring.

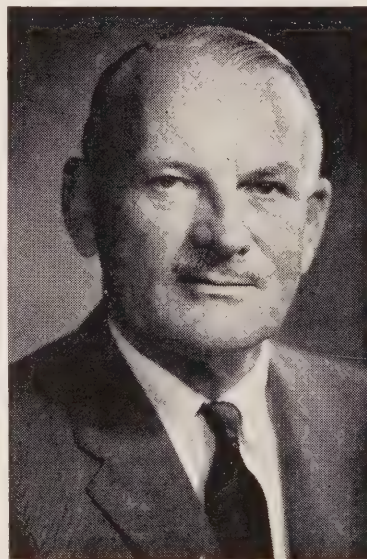
"Questions are being raised as to the validity of contemporary goals," he continued. "Much of man's progress to date has been based on the drive for more and better, and no doubt there have been misdirection. We have been more callous in the preservation and husbanding of our resources than justified. But the human basic instinct to do things better, faster and easier, and to use technology in increasing the fruits of our labors has endowed us with the high standards of well-being that we enjoy today, standards far beyond the dreams of those who preceded us."

"Let there be no mistake, mankind best flourishes by being productive. If we are to leave for future generations a better world in which to live, we must learn to employ technology, not just more, and more wisely," Mr. Gathercole said.

## A. W. Manby dies

Ontario Hydro's former general manager, A. W. Manby, has died.

Mr. Manby, who retired in 1959, was 73. During 38 years of service with Ontario Hydro, he saw the commission grow from a small organization to one of the world's largest electrical utilities, a growth in which he played a leading role.



A. W. Manby

Born at Niagara Falls, Ontario, Mr. Manby received his early education there, graduated from the University of Michigan with a degree in 1921. He interrupted his studies from 1917 to 1919 to serve his country as a flight instructor with the Royal Canadian Air Force, and was later a flying officer in the Royal Air Force 46th squadron in France.

Mr. Manby began his Ontario Hydro career in the construction department as a native Niagara Falls who spent a year working for Sir Adam Beck-Niagara generating station. From 1931, he served as an operator at the plant.

From Niagara Falls

Manby moved to head office and served in a variety of positions until he became assistant general manager — administrative — in 1947. He was named general manager eight years later.

Mr. Manby leaves two daughters. He was predeceased by his wife, Edith.



## co-ordination

every Canadian province bordering on the nation's north has certain programs for northern development, but what's lacking is a co-ordinated attack on the problem of Canada's underdeveloped northland, says Lands and Forests Minister Rene Brunelle.

Speaking to a Northeastern AMEU meeting at Hearst, Mr. Brunelle said legislators concerned with northern development must first of all decide that "we really want to develop our north. And once we have accepted this policy, we must strengthen it by agreeing to long-term planned development."

He added that the planning process involves a stocktaking of known resources, the socio-economic potential of each resource and a schedule of providing accessories to development.

Mr. Brunelle said the north is without question an underdeveloped area—the last frontier of Canada. "While it's recognized that development of the north is somewhat of a gamble, it's a gamble Canadians must take if our country is to grow and prosper as it can.

"The challenge is for federal and provincial governments and the private sector of our economy to establish dynamic policies and implement imaginative programs to achieve optimum social and economic benefits for the region. The odds in the gamble can be lessened by the very best planning supported by adequate research," Mr. Brunelle said.

Thessalon Hydro's manager J. H. Stewart was elected Northeastern AMEU president. Others elected included G. E. Delaney, Espanola Hydro, vice-president; J. H. Silverthorn, Ontario Hydro, North Bay, secretary-treasurer; and directors P. G. Oliver, Roniston Hydro, and Martin Hannan, Cochrane PUC. □

## Introducing Slowpoke

There are mini-skirts, mini-bikes, and now — would you believe — mini-reactor. And it works.

With a core only nine inches in diameter and 10 inches high, the small nuclear reactor is in operation at Atomic Energy of Canada Limited's laboratories at Chalk River. It consumes uranium fuel and goes under the whimsical name of Slowpoke, for Safe Low Power Critical Experiment.

AECL says Slowpoke can be used for neutron activation analysis (a method of identifying and measuring chemical elements in a material by bombarding it with neutrons); for the production of short-lived radioisotopes for medical treatment; for university and hospital research, and in forensic science.

It's safe, reliable, and maintenance-free, says AECL, and it can be turned on and off at the flick of a switch. It should run for at least 10 years without being recharged with fuel.

Meanwhile, Russia has announced the completion of a solar power station in Turkmenia, Soviet Central Asia, in the Kara-Kum desert. Engineers say that one square kilometre of light-transmitting elements will generate 80,000 kilowatts of electricity. □

## Yellowcake pact

Expansion of Rio Algom Mines' Quirke mill at Elliot Lake is already paying off.

Rio Algom has received a contract for 955,000 pounds of uranium-oxide (yellowcake) concentrates which will end up in Brunsbittel, West Germany, in 1972. The order supplements British, Japanese and domestic uranium business already on the company's books and marks the first time Rio Algom has cracked the continental European market.

The Canadian yellowcake is to be used in the 770,000-kilowatt Brunsbittel nuclear power station, near Hamburg. Part of the order will be filled by Rio Tinto-Zinc's South African subsidiary, Palabora Mining Co., in Johannesburg. The uranium will be obtained from its Marshalltown mine in the Transvaal. □

## Brownouts threat

The possibility of brownouts in some large US centres looms large this summer.

A recent survey for the federal administration listed potential trouble spots as New York City, Chicago, St. Louis and Minneapolis-St. Paul. "This summer," the report said, "the entire eastern seaboard, except for New England and Florida, will face a tight power-capacity problem even if normal summer temperatures prevail, fuel supplies are adequate and all of the system capacity performs as scheduled."

Insufficient generating capacity is the main reason for concern in the east, where air conditioners abound. In Ontario, the possibility of brownouts was ruled out by Ontario Hydro's operations personnel. A spokesman said summer is the traditional peak demand period in some of the larger US centres, while in Ontario the peak is usually reached during December. □

## No ice, thanks

British Columbia Hydro chairman Dr. Gordon Shrum has a lot of faith in the safety of the chemical the utility uses to defoliate power line rights-of-way.

And to prove it, Dr. Shrum drank a six-ounce glass of Tordon, mixed with water. He didn't use any ice in his unusual cocktail. Also downing a glass of the mixture, taken in a form twice as concentrated as that used in spraying projects, was BC Hydro's material standards supervisor, Phillip Slipec.

While he admitted the demonstration was a publicity stunt to counter recent criticism of the use of the defoliant, Dr. Shrum said it was intended to show the public the use of the chemical is not dangerous when used to clear rights-of-way.

He added: "I regret doing this kind of thing — it's almost the same type of publicity being sought by the ecology groups." □

## 4-H head

Ontario Hydro's manager of farm sales, John Moles, has been elected president of the Canadian Council of 4-H Clubs. He represents the Canadian Electrical Association on the council.

Mr. Moles was behind the formation of 4-H Farm and Home Electric Clubs in Ontario. He co-operated with the Ontario department of Food and Agriculture in the formation of a test club in the early 1960s.

The Farm and Home Electric Clubs were inaugurated after a two-year trial run in which young people were taught electrical safety, electrical terminology and the labor-saving potential and economics of electricity on the farm. □

## Oil train

Imperial Oil Ltd. has contracted for a unit train to carry heavy fuel oil from its Montreal refinery to Atomic Energy of Canada Limited's Bruce heavy water plant, now under construction at Douglas Point, on Lake Huron.

The first trains will have 42 cars, each holding 17,000 gallons, while later trains will have 63 cars, each capable of carrying close to 23,000 gallons. The train will make the 1,200-mile round trip twice-a-week starting in October, 1971.

Oil will be used for generating auxiliary steam required in the heavy water production process. An 11.4-mile spur line will be built from Port Elgin to the site.

Each tank car will have a larger-than-normal discharge valve and a specially constructed concrete pit under the track at Douglas Point will permit multiple-car unloading. Oil will be stored in 180,000-barrel tanks on site. □



## Very special guest

Visitors to the Bruce nuclear development are not uncommon, and often go unnoticed by a vast majority of the workers. But a recent one drew smiles and cheers from just about everyone on site.

Prime Minister Trudeau, during a tour of western Ontario, made a two-hour stop-over at the Douglas Point site to see Canada's first full-scale nuclear power plant in operation and get a first-hand look at construction progress on Atomic Energy of Canada Limited's heavy water production plant.

As he made his swing around the nation's nuclear power capital the Prime Minister chatted with many workers, including Douglas Point generating station operators, construction workers and office girls. He took time to give the crane operator a break while he manned the controls and asked "innumerable questions" of just about everyone around.

Mr. Trudeau is shown greeting a construction worker at the heavy water plant. □

## Shrimp warmer

There's a lot of talk these days about warm water discharges from thermal-electric plants causing environmental problems, but the talk's all good around the UK's Bridgewater nuclear plant.

An adjunct to the Bridgewater plant is one of the world's most unusual shrimp farms, where the succulent shellfish grow three times as fast as their sea-bred relatives.

Lt.-Cmdr. Maurice Ingram, working with the Central Electricity Generating Board, is "farming" his shrimp in water warmed by the power station to about 12 degrees warmer than the sea in nearby Bristol Channel.

The shrimp, he says, will be fully grown in 18 months instead of the normal three to five years they take in the sea, and they'll grow all year around instead of just in the summer. □

## Operations revamped

Ontario Hydro's director of operations, Robert H. Hillery, has been appointed assistant chief engineer — operations. The move is part of a total reorganization of the operations division, leading to the creation of three new divisions.

Mr. Hillery took over as director of operations in 1957 after holding several responsible positions with the commission including assistant superintendent of the Niagara system, operations engineer in Central region and administrative assistant — regions.

Chairman George Gathercole said in announcing the change that it was prompted by the continued expansion of the scope and technical complexity of Hydro's operation of fossil-fuelled generating stations.

"This expansion," Mr. Gathercole said, "is placing increasing emphasis on the need for co-ordination of the planning, training and technical aspects of the operating and maintenance functions associated with thermal plants."

New divisions created included a thermal generation division, which will be responsible for all nuclear and fossil thermal plant operations, under the direction of L. G. McConnell; power system operations division, under the direction of W. A. Polson, and a system maintenance division, under the direction of N. D. Lindsay.

Other appointments in connection with the reorganization include: E. D. Holdup, thermal operations engineer; L. W. Woodhead, nuclear operations engineer; E. P. Horton, superintendent, Pickering generating station; D. C. Milley, superintendent, NPD generating station; G. R. Childerhose, production superintendent, NPD; W. H. Winter, operating engineer, and B. K. Smith, electrical maintenance engineer. □



"Hello there"

## municipal briefs

**St. Catharines PUC** has a novel approach to getting its ele bills out to the customers, despite rotating mail strikes. A group of university students has been hired to deliver the bills by hand. **Peterborough Utilities Commission** has received city council approval to proceed with the second phase of its Filter Park zoo at a cost of \$80,500. The second phase includes fence construction of a sewer extension, road work, erection of animal and bird shelters, and the purchase of zoo livestock.

**Ross L. Dobbin**, former general manager of Peterborough Utilities Commission and a man whose lifetime had gone into almost every community endeavor in that city, has died at the age of 67. Ontario Hydro honored Mr. Dobbin by giving his name to the Lily Lake transformer station.

**Trenton PUC** employee Price Morris recently took three weeks off work to represent Canada in the weight-lifting competition at the British Commonwealth Games in Scotland.

**Electrical Utilities Safety Association** certificates of merit for accident-free work were presented to six northern utilities at a Northeastern AMEU meeting at Hearst. Receiving the awards were Kapuskasing PUC, Thessalon PUC, Hearst PUC, Cache Lake Hydro, Chapleau Hydro and Espanola Hydro. M. O. Shepherd, EUSA field safety supervisor, made the presentations.





## as don wright sees it

the final outcome is still to be decided but one thing is becoming apparent — what goes up doesn't necessarily come down in a hurry. We are speaking, of course, of the mini skirt and the courageous fight the ladies are putting up against the fashion mongers who would bring them to their knees — and below.

To see or not to see, that is the question we males have to face and the signs are encouraging. Reports from our legmen suggest that while the boutiques are full of midis, the streets remain crowded with minis. They say department store racks featuring the new shinbone length are being rubbed except by the furtive few with something to hide. And that's good.

All the high-pitched sound and fury in the world signifies nothing to the couturiere whose ear is sensitive only to the fearful sound of silence at the cash register.

Who will bend first? From a purely selfish point of view, we hope it's a gal in a mini but only after the war is won. Fall fashions should tell the tale, at least a piece of it. Best bet is that the mini will stay with the girls adding one or two selections from the freak look for special occasions such as funerals and Halloween. They should also be helpful in keeping the grackles out of the corn patch and the crows away from the cherries. In spite of the mess he appears to be making of things in general, man continues to regard himself as a pretty superior kind of animal. Recent reports tend to raise the question — why?

Take the recent theory put forward by the authoritative Journal of Occupational Medicine explaining man's survival in the face of competition from a wide assortment of better equipped creatures. "He survived," it contends, "because of the tank."

"Early in time," the Journal points out, "man came the smelliest creature on earth. As a consequence, man made poor eating. He was not liked day and night by the many flesh eating creatures. . . . Man was left alone to go about his evolutionary process."

This puts the kibosh on the more comfortable proposition that man attained his present status through conscious effort and superior brain power. Not that he isn't doing everything possible to live down the pungent past. Last year, Canadians alone spent well over \$400 million on deodorants, creams, lotions and soaps.

The danger here is that he may end up smelling

as nice as the other animals, thus negating his built-in protection and rendering himself easy prey for the predator.

■ Actually, there is evidence to suggest that some of our feathered and four-footed friends are as guilty as we are in messing up the environment. According to a report of the International Joint Commission on the Great Lakes, each farm operation that produces 400,000 broiler chickens, 50,000 laying hens or 5,000 market hogs generates a waste disposal problem equal to the human waste from a city of 10,000 persons.

If we ignore air pollution caused by cars, industry and what have you, there is some satisfaction to be found in the knowledge that pigs are twice as dirty as people.

■ Or is there? If the physiologists know what they're talking about, pigs are man's first cousin. No matter how much we may admire the lordly lion, the speedy horse or the loyal dog, we have a lot more in common with the squealing pig. Even his ailments resemble ours from rheumatism to stress-induced peptic ulcers.

An ulcer outbreak in one herd of swine was traced to a change in ownership. A quiet, gentle herd manager had been replaced with a more aggressive individual whose personality clashed with those of his charges. Crowding and competition for food and space are other ulcer producing circumstances man and pig suffer in common.

If, as some claim, alcohol is likely to bring out a person's true personality, then the people-pig parallel is all the more remarkable. A herd of Florida pigs recently came upon a big batch of fermented corn and promptly proceeded to make people of themselves. The owner reports that some of the drunken swine squealed playfully while others got ill tempered. Still others just staggered off and went to sleep.

Not that pigs can expect to reap any benefits from their special status. In fact, their human similarity is having a disastrous effect from the porcine point of view. Porkers are more and more in demand for laboratory purposes.

■ If, after all this, man still feels superior, he can pick up a copy of a paper presented by John McDonough at the 38th annual Couchiching Conference, and forget it. The superiority that is. The treatise is entitled *The Hastening Obsolescence of the Human Male and His Eventual Decline into Uselessness*.

No, the pigs are not about to take over but the ladies are. Consider the following excerpt:

"Because of technology, we are seeing the end of man and the emergence of woman. Machines are rendering the male obsolete. In the past his was the role of the hunter, the warrior, but technology is removing the grounds for his superior role. . . . Man the decision-maker is no more. Who needs the male to decide when we have the IBM computer?"

At least this is an intra-mural takeover with man, as represented by woman, still in command. And if the male man behaves himself he should be able to stick around for some time to come as a pet. Surely the ladies will see fit to establish warm, comfortable pounds for those of us who must be put to pasture.

A full month at the pound should be mandatory before any of us are put to sleep or turned over to a laboratory with the hope that a home might

be found. Flea powder and man biscuits should be supplied by the state.

■ We have tended to be far too slipshod in our own personal time-keeping methods and it's good to learn that the US Bureau of Standards is on the job. One of their objectives is a more accurate timepiece. And no wonder.

It seems they've been using an atomic clock which has an accuracy of only about one part in  $10^{12}$ . This means that it could gain or lose a full second in 6,000 years. Whether or not staff members are still coming in late we wouldn't know but the search is on for something a little more precise. The hydrogen maser looks promising and is expected to prove about 100 times more accurate than the atomic job.

Even so, this suggests that it could be out as much as a second in 600,000 years which is likely to prove unacceptable to those of us in car pools or on commuter schedules where even nanoseconds count.

In the face of all this, our one-handed Mickey Mouse model seems a bit inadequate but what kind to choose? Some speak highly of the old-fashioned dry cell-operated timepiece but this seems primitive in view of developments.

One company has made a solar wrist watch with a battery which is recharged by the sun and other light sources. Clocks using quartz are already on the market and we saw something entirely different the other day which seems certain to catch on. It had a funny little knob at the top which, according to the owner, simply requires a bit of turning to make the watch run for up to 24 hours.

■ Time measured in seconds is one of the four basic metric units which also include the metre, kilogram and kelvin. But when Canada does convert to the metric system there will be more involved than measurement. As the Kingsville Reporter recently observed, think of all those bon mots which will go out the window along with the yards and gallons. For example:

A miss is as good as 1.61 kilometres; there isn't 0.06 grams of truth in it; he felt 3.05 metres tall; he was wearing a 45.43 litre hat; first down and 9.14 metres to go. Not forgetting, of course — don't hide your light under 0.363 hectolitres.

■ Pollution is something which must be viewed with alarm at all times but we think a brief smile should be permitted in connection with a recent episode down Trenton way. Seems like the operator at Hydro's Frankford generating station on the Trent River, who happens to be an ardent conservationist, was highly disturbed one morning to find a number of plastic bags and huge cardboard boxes of garbage washed up against the station racks.

He promptly started rooting through the mess looking for a letter or some other clue to the culprit's identity. Long before the job was over the garage operator across the street made the scene and hollered: "What are you doing with my garbage and where's my truck?"

A spreading oil slick upstream provided the clue. Seems as if this fellow was taking a load of garbage to the dump, parked by the river for a moment, out of gear, and returned to find the vehicle gone. Truck and garbage were eventually re-united to everyone's satisfaction. □



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# ontario hydro news

september/1970

Government  
Publications

apple valley •

Lennox breaks new ground •

sound of the stars •







# news september/70

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## the cover

Sunny Jamaica? No. Actually it's the Collingwood area where West Indian workers come each fall to pick close to one-third of all the apples produced in Ontario. For more about the apple and other industries in this part of the province, turn to page 4.

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## Viewpoint

# Too much power?

During this decade, electric power demands in this province will double. To meet this requirement and to provide adequate reserves, Ontario Hydro will build up its generating capacity from 12,000,000 kilowatts at present to 28,000,000 kilowatts by 1980 at a cost of several billion dollars.

Some people are beginning to ask whether or not all this electricity is necessary or desirable. Electrical utilities are being criticized for promoting the use of their product in the face of mounting environmental problems with the suggestion that much of this power is being used by our affluent society for such purposes as stirring cocktails or carving the Sunday roast.

The facts suggest otherwise. Almost 70 per cent of all the electricity supplied by Ontario Hydro is consumed by commerce, industry and farming. Of the remainder, the great preponderance serves such basic residential needs as home and water heating, lighting, cooking and laundering. Frivolous or gimmicky uses are insignificant.

Demands for electricity will grow whether or not its use is promoted. Marketing techniques as employed by the utilities are designed to influence the growth pattern in such a way as to utilize the existing equipment to fullest advantage. This is one of the few measures available to help counter rising costs. Difficult as it may be for the layman to grasp, selective load promotion works to the ultimate advantage of both the customer and the utility.

More disturbing and less credible is the "zero growth" school of thought which seems to be emerging. Its proponents take the view that growth of any kind, including electric power production, increases pollution and must be eliminated.

This is negativism in its ultimate and most selfish form. Even if it were practical, what would the proponents of a no-growth society tell the millions of young people who will be entering the labor force in the next dozen years? What is their answer to the substantial portion of the population which has yet to claim economic and social equality? Without growth, how do we provide better housing, schools and services which can be ours through the development of our knowledge and resources?

Economic growth and the preservation of the environment are compatible. The challenge is to achieve both and electricity seems likely to provide many of the answers.

Of all the forms of energy available, electricity is the cleanest and most versatile. Granted, its production involves the burning of vast quantities of fossil fuels and while this cannot be done without discharging some impurities into the atmosphere, the energy conversion process must be viewed in perspective.

Combustion of coal or oil or gas in a modern generating station is carried out under conditions that minimize and disperse contaminants far more effectively than can be done by small, less efficient combustion units in homes, apartment buildings and factories. The gap is likely to widen as thermal-electric technology continues to advance. In addition, concerted and widespread efforts are being made toward the removal of contaminants released to the air through combustion so that a breakthrough seems likely in the near future.

And at the end of the rainbow is the promise of economical and inexhaustible power from the atom. Evidence continues to mount that nuclear plants will provide the long-term answer to the dual requirement of abundant power and a healthy environment. □



# the thirsty titan

by E. C. Farrell

Weathered stucco on stone walls, high ceilings. Sheltering comfortably under the shade of a giant oak, with a yellow rosebush outside the kitchen door, it could be any one of a hundred farmhouses. Typical, average rural Ontarian, set discreetly apart from the barn and outbuildings.

Inside, the similarity ends. It's a yesteryear vision of butter churns, sleepy fireside cats and the smell of something good cooking on the stove shattered by the hardhats and orange lifejackets hanging up in the kitchen. It's a dream that ceases abruptly with the maps and blueprints on the walls and tables in every room and the staccato voice on the two-way radio that links the draftsmen in what used to be a bedroom with the three-man crew drilling from a barge off-shore and the survey team in the adjacent meadow.

An era of quiet rural existence is about to close. A \$300 million generating station is in the making.

With the waters of Lake Ontario lapping almost at the front gate, the farmhouse at Bath, near Kingston, serves as field headquarters for the 20-man vanguard of a 1,700-strong work force that will be assembled for the construction of Lennox, Canada's largest oil-fired power plant.

The decision to use oil at Lennox followed an investigation by a major consulting engineering group which revealed that the economic advantages of oil over coal were even greater than had been estimated by a preliminary report by Hydro engineers. The capital cost of the oil-fired station would be \$20 million less, said the survey, with reductions in operating and maintenance costs of \$2.3 million over the economic life of the plant, scheduled to be in full production in 1977.

Huge tankers with a capacity of 100,000 tons will transport the oil from Caribbean ports to Quebec City, where storage facilities will be established. Vessels of about 20,000 tons will then carry the fuel through

the Seaway to Bath. The oil will be piped underground from the station's dock to the storage tanks.

One of the tough problems faced by engineers is the size and complexity of the oil handling and storage facilities required at Lennox. Projected demand is expected to reach 13.5 million barrels in 1976-78, with a possible peak demand of 17.7 million barrels a year.

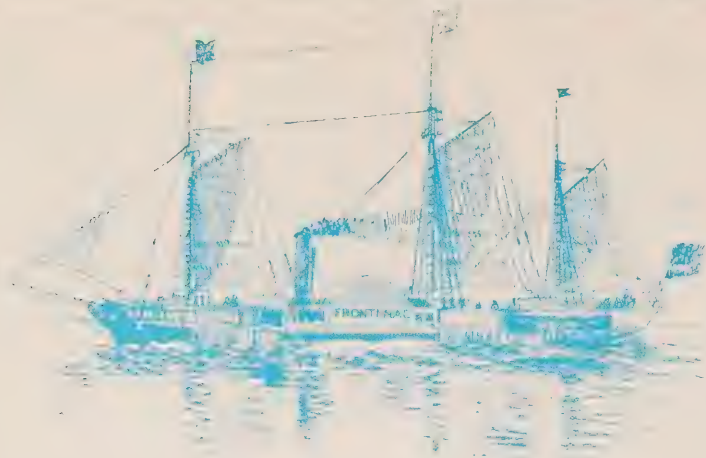
Present plans call for 12 steel tanks, each 48 feet high and 360 feet across, which will hold a total of 10 million barrels. (This amount, if it were fuel oil for domestic use, could heat all the homes in 17 cities the size of nearby Kingston during a severe winter.) Reserve storage of 2.8 million barrels will provide against an unusually long period with the Seaway frozen.

The oil has to be heated to flow freely, so, in addition, there will be two smaller tanks, kept at an operating temperature of around 130 degrees F., which will provide sufficient fuel to run the station for one day. The total capacity of the four generating units at Lennox is 2,280,000 kilowatts — twice the present power demands of Kingston, Belleville, Hamilton and Ottawa combined.

As a precaution against possible rupture, the tanks will be paired off in dykes with eight-feet high walls which will be able to hold the contents of one full tank plus 10 per cent of the other. The two smaller tanks, with dyke walls six feet high, will have compounds big enough to contain the full capacity of each tank. Pipes and ditches will take rainwater from the oil farm area to treatment ponds where it will be purified before being returned to the lake.

The views of some local residents and organizations over the siting of a generating station in a scenic area and possible ecological effects have been carefully investigated by Ontario Hydro. Officials have met with various interested groups since the announcement of the station





in December, 1968, explaining the need for more electric power, answering questions on the cooling of the plant's effluents, the appearance of the station and its possible effects on the village of Bath, which owes its origin to the United Empire Loyalists who went there in 1784. Now a pleasant little village of 850 people, Ernestown (it was renamed Bath in 1812) was settled by members of Jessup's Loyal Rangers. By 1812 it had become the commercial and educational rival of Kingston, with the province's first grammar school and public library, established in 1811 by public subscription.

A flourishing port, Bath also saw the launching, in 1816, of the first steamboat to sail the Great Lakes, the 170-foot Frontenac.

With a population of around 1,500 and industries that included foundries, shipyards, carriage factories, blacksmith shops and harness making, Bath appeared to have a bright future. However, according to a local historian, an avaricious landowner made such exorbitant demands upon the Grand Trunk Railway for a right-of-way, that, "to escape further trouble, the plans were altered and the line avoided the village, which has ever since paid a heavy penalty for the rapacity of that short-sighted individual." Actually, other, earlier factors played a part in the village's decline, including the choice of Kingston as a military and naval centre and the construction of the York (Toronto) road westward from Kingston through Odessa to Napanee, with Bath by-passed. But the final blow was the loss of the railway line, and a steady drift of industry and population followed.

The generating station could mean renewed prosperity for Bath, for the economic benefits should be considerable with a construction staff of 1,700 during the peak years 1973-4 and a permanent operating staff of 200 on completion in 1977.

Bath has good harbor and docking facilities, sheltered as it is by Amherst Island and the peninsula to the west. The water is 27 feet deep within 100 feet of shore, and at a distance of 500 feet from shore goes down to 60 feet.

Lennox will use a maximum of one million gallons of water a minute, with one-third of this used for tempering, which was selected as being the most applicable heat dissipation method for the site. This is a mixing of cold water with the warm water from the condenser. Discussions on this have been held with the Ontario Water Resources Commission and with the Department of Lands and Forests.

Although much has yet to be learned about the effects of thermal discharge into rivers and lakes, and comprehensive off-shore studies will be carried on by Hydro for many years, it seems that such disturbance is not always detrimental. For instance, the outfall channels at both the Lakeview station in Toronto and the Lambton station near Sarnia attract both fish and fishermen, while in the winter ducks congregate in the warmer water of the channels.

To reduce the pollutants from oil-burning to a minimum, Hydro engineers have searched Europe and the United States for the most modern and efficient precipitators. Although the total cost of the Lennox air quality control program has yet to be established, it is expected to be more than \$8 million.

Lennox will have two stacks, about 650 feet high, each with a single flue fed by two units. Space is being left around the stacks for the installation of additional purification equipment as it becomes available. Oil, incidentally, produces 0.1 per cent of fly ash compared with coal, which contains up to 10 per cent.

Hydro is also pioneering at Lennox with Low Excess Air Firing. Used with great success in Europe and Japan, this entails an



*First steamboat to sail the Great Lakes, the 170-foot Frontenac, was launched from Bath in 1816. The farmhouse (above and right) was used as a field office during initial planning on the \$300 million Lennox.*

extremely accurate balancing of fuel and air not possible with coal. Using a minimum amount of air means greater efficiency in burning the fuel with less flue gas going up the stack. Other advantages are reduction of total stack emissions; significant reductions in the formation of oxides of nitrogen, and reduced maintenance. With low excess air oil firing, about 10 per cent less flue gas is given off compared with coal for the equivalent energy output.

Says Arvo Niitenberg, manager of engineering for Lennox: "We are doing our best to cut down pollution, not just what we have to do to meet regulations."

As with the Lambton station, which has drawn admiring comments for its appearance, every effort will be made at Lennox to combine aesthetics with practicality. Although it would have been cheaper to have sited the stacks near Highway 10, which runs along the lakeshore, Hydro is spending approximately \$250,000 to move the turbine hall nearest the lake. The site will be screened by trees, and a landscaped mound with trees will also form part of the station. Parking, washrooms, an information centre and viewing platform will be provided for the public.

The area where the United Empire Loyalists made their homes has been called "the Cradle of Ontario," for the descendants of those early settlers must now nurture hundreds of thousands. It is perhaps appropriate that Hydro's first oil-fired generating plant should be born here, an extension of the energy and resource of those pioneers who cleared the forest, tilled the land, and built homes, schools and churches to make a new life for themselves and their children. □





*Offshore investigations  
continue at the  
Lennox site.*

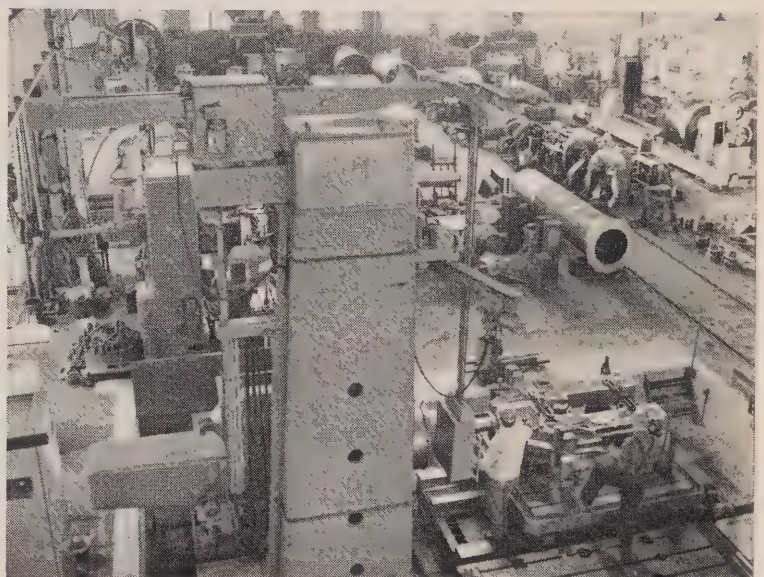
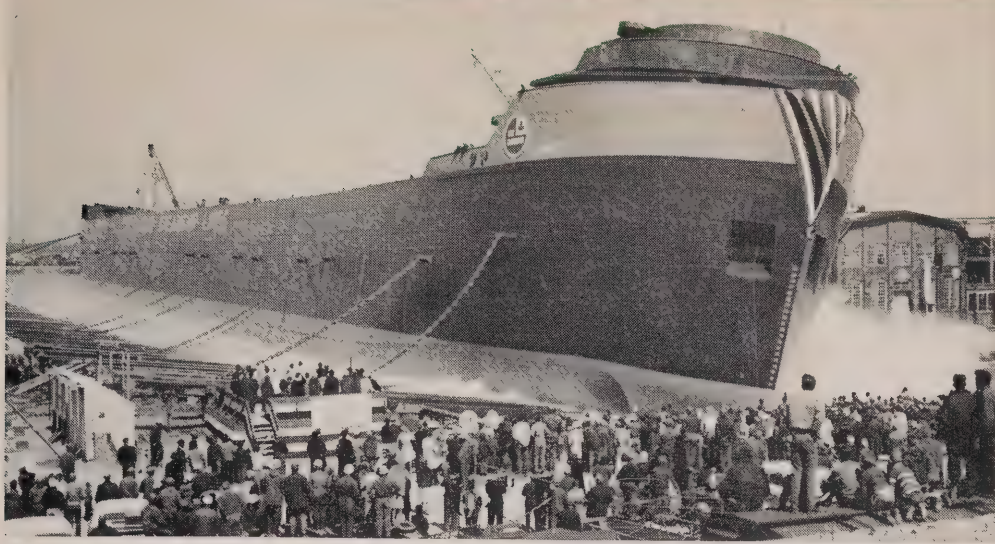




# NO ONE'S CRYING THE BLUE MOUNTAIN BLUE

by Rae Ho





*Much of the Great Lakes fleet was built in Collingwood and much of it has put into port here for repairs or remodelling. Typical of the town in better days was the splash as a hull was launched. Now the shipbuilders are looking for general engineering work to keep the well-equipped machine room (lower right) busy.*

centuries, the Huron Indians fashioned shoes from the rich stands of white birch along the southernmost shores of Georgian Bay. Later, in the mid-1800s, sailing vessels from the US midwest would line up as many as a dozen at a time to unload their cargoes of corn or grain in the small port that is now Collingwood.

Through the years, the name Collingwood has been synonymous with Great Lakes shipbuilding. Much of the fleet was built here. Much of it has put into the port for repairs or remodelling.

SS Huronic, first steel ship built at

Collingwood Shipyards, was delivered in 1902. Hull 195 is now on the keel blocks. And after her . . . the curtain could ring down on a chapter in Canadian history that's become almost a legend.

There'll be no work for the shipbuilders come November. Although 1,300,000 tons of the Great Lakes fleet needs replacing within the next decade, the cost of money is too high for the owners. W. A. Webster, general manager, figures the trend will change, but how soon he isn't sure. He's hopeful of finding easier money for the fleet operators and in the meantime the

shipbuilders are looking for general engineering orders to keep the men working.

But even with an ailing industry that's been the bread and butter of local families for three generations, they're still not crying the blues around the Blue Mountains.

To the contrary.

Collingwood has still plenty to smile about. The tourist industry is booming, winter and summer alike. The area's multi-million dollar ski business is setting and smashing records just about every weekend all winter long. The Collingwood-Craigleith potters are turning out fine giftware for a world-



wide market. And between opening day and the close of the season, the influx of fishermen into the area stretching from Collingwood to Meaford (some of the best rainbow trout fishing anywhere is to be found here) pours plenty into the local coffers.

There are other reasons for optimism, too. The area can supply a wide range of goods for the consuming public — from furniture in Collingwood to applesauce in Thornbury or turbines in Meaford.

Raw material for the applesauce — and juice — industry is close at hand. Close to one-third of all the apples produced in Ontario are grown in the Thornbury-Clarksburg, Beaver Valley area. It's almost another Niagara — without the peaches.

Even at that, history records that peaches grown in Clarksburg "carried off first prize" at the Chicago World's Fair of 1893. But, says Charles Crysler, who's been growing apples in Beaver Valley for 30 years, "some of us tried peaches around 1939-40 and it didn't work — I guess it's just a little too cold for them here. We do grow a lot of plums in the area, though."

Mr. Crysler, who's typical of the "150 or more apple men" in the district, operates 48 acres of orchard and averages about 300 boxes of fruit an acre.

McIntosh, Spys and Wealthys are the prevalent varieties. However, there are some Snows and scattered trees of Delicious. "The Macs, Spys and Delicious are big on the fresh fruit market, although it's hard to get commercial production out of a Spy apple tree for at least 15 years. Until then most of the yield goes for peelers — the kind they use for sauce and juice."

Even then, Mr. Crysler adds, about 60 per cent of the Spy crop consists of greenings (apples that remain green all the time) and these, too, are used for the production of applesauce. "They're good cookers, but the color isn't right for the fresh fruit market," he says.





Close to one-third of all the apples produced in Ontario are grown around the Beaver Valley. Flawless McIntosh are packed in the fields at one Georgian Bay orchard (left) while workers cool off with a glass of sweet cider pressed in the fields at another.



The Beaver Valley apple industry came into being around the turn of the century. In the early years, the Spy was the biggest crop by far. The district was extremely well suited for this species and Macs were virtually unknown at the time. Mr. Crysler says the Mac is still a relatively new apple, having been found growing wild on the farm of John McIntosh at Dundela, in the St. Lawrence Valley.

Mr. Crysler is one of the 100 or so members of the Georgian Bay District Fruit Growers' Association, which recently voted to institute a commission to cut the mark-up between grower and retailer. Mr. Crysler says the retailer takes 30 to 35 per cent profit on a basket of apples, which his colleagues in the association feel is "way out of line."

But, he adds, despite drawbacks like weather and occasional bad crops, "fruit growing is a nice business. You're out in the open air all the time. It's a very good way to spend your life."

Down the road, in Thornbury, more than 250,000 bushels of peelers, most of them from the Beaver Valley, are processed into applesauce or juice in roughly five months. In addition, the processing plant can store up to 200,000 bushels in controlled-atmosphere rooms.

Electricity is vital to modern apple processing. It operates the peeling and chopping machinery, generates the steam used in the cooking process, pumps the sauce and seals the cans. In the manufacture of juice it operates the huge mills, the intricate pasteurizer system and even measures the amount of vitamin additive. It also cools the storage rooms.

Not all the Beaver Valley peelers are shipped to Thornbury, however. Tons of apples are delivered to the 60-year-old evaporating plant at Clarksburg, the only one of its kind in Canada, where they are dried for use in making mincemeat.

But there's more to Thornbury than apples.



Between apple harvests, Georgian Bay growers cultivate strawberries to ensure a cash crop. Strawberry picker, designed and built in Meaford, enables workers to lie face down on padded boards for comfort.





*One of Ontario Hydro's earliest suppliers, Barber Turbine and Foundries, opened its doors for business in Meaford in 1867.*

Right across the road from the processing plant, Teledyne Canada turns out hardware for mines the world over, including four-wheel-drive trucks capable of climbing a 35-degree slope. The 108 employees also produce 90 per cent of all high-speed tool bits used in Canada.

### the power picture

Collingwood PUC provides electrical service to 3,700 customers and last year recorded a 16,800-kilowatt peak load. There's a pretty fair blend of residential, commercial and industrial users and several all-electric homes in this town of 9,500, but manager W. G. Lane still isn't satisfied.

His fondest hope is for an all-electric subdivision, which until now the town has lacked. "But that won't be the case for much longer if we have anything to do with it," he says as he surveys the town map. "We're bound to get one of these future subdivisions all-electric."

Industrial growth has been slow in Collingwood, incorporated as a town in 1858. It wasn't until the late 1940s that any marked industrial expansion took place, but since then several large firms have established themselves there.

In 1965, when Collingwood was named a designated area for industrial expansion by the provincial government, the PUC's consumption figures began to soar. Eight new industries, all with substantial loads, have opened in the past five years bringing the commission's industrial customer count to 54.

As for the future, a large extension to the district collegiate will result in the Simcoe County District School Board installing a sub-station to be fed from the PUC's 44kv distribution network. And then there's Mr. Lane's all-electric subdivision.

into what is now one of the largest mining hardware businesses in the world.

Engineering firms abound in the area. In Meaford, Barber Turbine and Foundries opened its doors for business July 1, 1867. Specialists in small turbines, Barber is one of Ontario Hydro's earliest suppliers and still continues to do business with the Commission. Many small hydro-electric stations bought by Hydro over the years were originally installed with Barber turbines. Now the company does repair work not only on the equipment that has served so well but on larger turbines of more recent vintage.

Barber Turbines still retains century-old quill-penned orders for equipment. But one of its proudest possessions is a personal letter from the late Governor-General Vincent Massey, six months before his death. Mr. Massey's mill contained a Barber turbine and he wanted to know what precautions should be taken to protect it.

From the 103-year-old red brick building at the foot of the hill facing the Big Head River, small turbines under 10,000 horsepower and replacement runners are still turned out regularly for the domestic market. And several overseas markets have been recently quoted on.

At the other end of town is one of the few remaining hardwood floor manufacturers still in business. Stanley Knight Ltd. copyrighted its Beaver Brand flooring seven years after the turn of the century and is still going strong.

In the business, says manager Jim Knight, they use two types of lumber — oak, which is imported from Pennsylvania and West Virginia, and hard maple from their own stands and other wooded areas within a 25-mile radius of the Blue Mountain area.

Competition in the flooring business is pretty rough — from the carpet manufacturers — but Mr. Knight isn't too concerned.

He says there's still a place for high-quality hardwood flooring in schools, church industrial and commercial offices and home. In fact, he's just shipped a batch to a home-owner in Jordan.

One of the biggest single industries to come to the area since the second world war is skiing. Winter sports fans flock their thousands from the Toronto-Hamilton region each weekend. Up to a quarter of a million traverse the slopes from Collingwood westward in a single season. Local operators have invested millions in the sport and this year they had 20% of excellent conditions.

The sport provides year-round employment for many local people. During the off-season there's the tows to be maintained, new trails to be blazed, a concentrated program of erosion control and general repair work. During the season itself, hundreds more are employed in jobs ranging from tow operators to waiters.

Bill Whalen, who manages the Georgian Peaks resort — where Nancy Greene won Canada's top ski prize, the Senator Carleton trophy — says it's the fastest growing recreational industry in Canada. Every year the number of people heading for the slopes increases 15 to 25 per cent.

"Electric power's the ski resort operator's best friend — absolutely number one," says Mr. Whalen. "Without it we'd be in real trouble trying to operate the lift. 85 per cent of the cottages around here are electrically heated, too."

A red-haired boyish-looking man of 40, Bill Whalen skis every trail at Georgian Peaks every day of the season. It's a part of the job, he says.

Whether it's skiing, apple growing, ski building or general engineering, it's the diversity of industry that offers great hope for the Collingwood area.

Certainly, no one's crying the blues. Yet — the over-all picture looks too good



ITEMS HARVESTED IN CROP ACCOUNTS

IM06	DAY	DESCRIPTION
CORRECTION ENTRY NO.		
20	A 21	C

CAN FARM

CANADIAN FARM MANAGEMENT DATA SYSTEM

TRANSFER

TRANSFER OF LIVESTOCK AND LIVESTOCK PRODUCTS

DESCRIPTION

BORN OR HATCHED

IM07	DAY
CORRECTION ENTRY NO.	
40	A 41

IM05	DAY
CORRECTION ENTRY NO.	
4	A 5
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

MONTH

2

B

19

IN ACCT	QUANTITY	UNIT	NO. OF ACRES
NUMBER			
MOD.			
H 29	H 30		

PHYSICAL AMOUNTS

The farming industry has experienced some dynamic changes in the past two or three generations. Tractor and combine have replaced horse and scythe as symbols of today's agriculture. Farming, in response to the economic pressures of recent years, has become more and more businesslike, requiring the keeping of detailed records.

Now it appears that the progressive farmer of the seventies will have to become as proficient at filling in computer data sheets as he is at operating a tractor. Already, about 700 Ontario farmers are using computers on an experimental basis in the management of their farms through Canfarm - Canadian Farm Management Data System - operated in Ontario by the Canada Department of Agriculture and the Ontario Department of Agriculture and Food, through its extension branch.

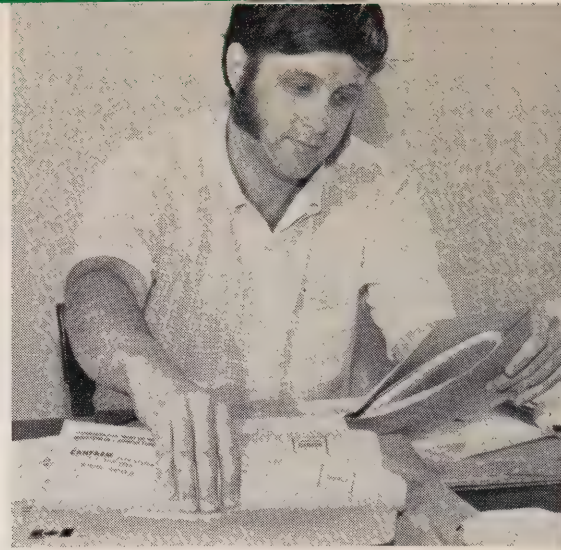
"The computer will become an important piece of machinery for many Ontario farms," says Bruce McCorquodale, program director, farm management information systems, for the Ontario Department of Agriculture and Food.

"Canfarm is not acceptable to everybody. Its operation is complex. It takes time to learn to use it, but it will provide a great opportunity for those farmers who grasp the opportunity."





*Elora beef producers Mr. and Mrs. Douglas Lindsay complete data sheets for processing at Canfarm office.*



*Farm reports arriving at Canfarm data centre are audited, encoded and fed into the computer. Processed reports are usually mailed back to the farmer within 13 working days.*



It is generally recognized that keeping records is a tedious task, disliked by most farmers, but it has to be done if one is to manage a viable farm business. By enrolling in Canfarm, the farmer can expect to get a fast, complete, and relatively easy farm record service.

A computer performs the arduous task of adding, subtracting, balancing and calculating his financial transactions. It gives the farmer detailed information on the management of his farm, leaving him to interpret and apply the information.

"Canfarm has enjoyed a very good reputation among farmers," says Karl Keeler, executive director of Canfarm, at Guelph, Ontario. "Last year was our first widespread

experimental year and we had about 500 farms enrolled across Canada. This year it is about 5,000 and considerable expansion is planned over the next few years."

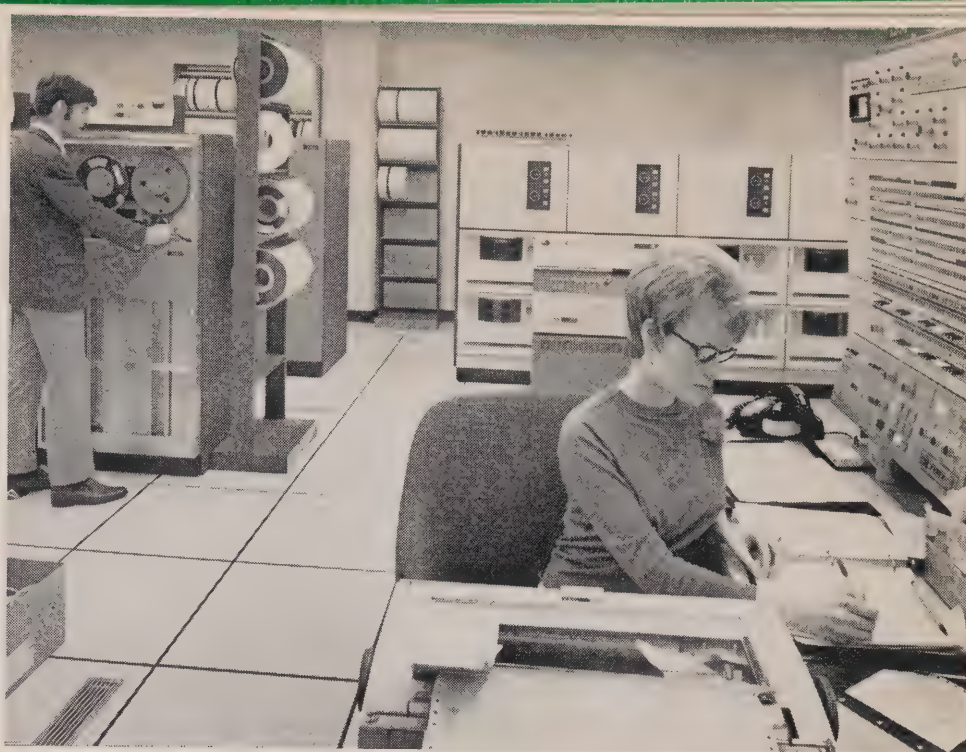
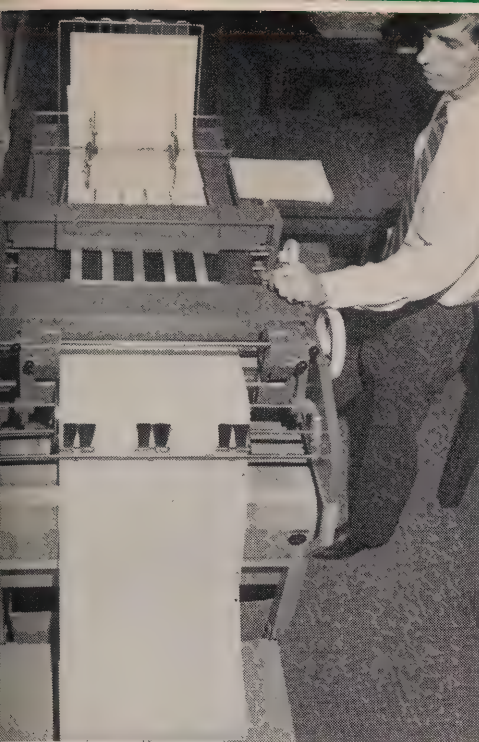
Some farmers want only the simplest kind of analysis for their farming operation while others want a complete and comprehensive analysis of their business and all its components including, for example, a given pen of hogs or steers. Canfarm can serve both groups, as well as the large group that falls between these extremes. It provides a number of options from which a farmer can select the type of system most suitable for his purpose and can progress from a simple to a more complete system as his needs and experience increase.

Processed reports are generally mailed to the farmer within 13 working days after the data arrive. It's expected the farmer will submit his data for processing monthly.

Monthly reports include an itemized list of receipts and expenditures for each enterprise or account, a statement of the current status of each credit account and a summary showing the totals for all enterprises and accounts. These monthly reports show the figures for the current month and for the year to date.

Periodic reports may include an analysis for a specific lot of hogs or pen of steers. Annual reports include a cash income statement to assist in the preparation of





ome tax and other returns. They also  
ude an accrual income statement and  
preciation schedules. In addition, they  
ude an owner's equity statement and a  
ncial analysis of the farm as a whole.

most useful part of Canfarm, however,  
e analysis of each farming enterprise.  
ay show, for example, the average  
s and return per hundredweight of  
Future development of Canfarm will  
ide comparisons of the averages of  
ar operations on different farms.  
s, if a farmer has an enterprise that is  
ing less than average, the analysis  
help to pinpoint what is wrong and  
the earnings can be increased.

the records submitted to Canfarm may in

the future be used collectively to show  
averages, the confidential nature of farm  
accounts is protected at all times. Individual  
records are not released without the  
written permission of the farmer.

What do the farmers think about Canfarm?

Cedric Harrop operates a 100-acre farm  
a few miles west of Guelph. Hogs and  
corn are the mainstays of his operation. He  
markets about 1,500 hogs annually and  
grows about 75 acres of corn to feed  
them. He has recently added a third line  
— 80 Suffolk ewes — and is building up a  
viable sheep operation.

"Canfarm provides a running commentary  
on the operation of my farm," he says,  
"and this is something I needed. The

information is broken down into fine detail.  
The corn, pigs, and sheep are all separate  
enterprises and you can cost-price each.  
The money management on my farm has  
been greatly improved."

However, Mr. Harrop doesn't exhibit blind  
enthusiasm. He feels, for example, that the  
filling in of the computer data sheets is  
too complex for many farmers. He believes  
they will require the services of a book-  
keeper to do this.

At any rate, Canfarm is a very novel  
approach to farm management and has the  
potential to provide a needed service to  
Canada's largest single industry — agri-  
culture. □



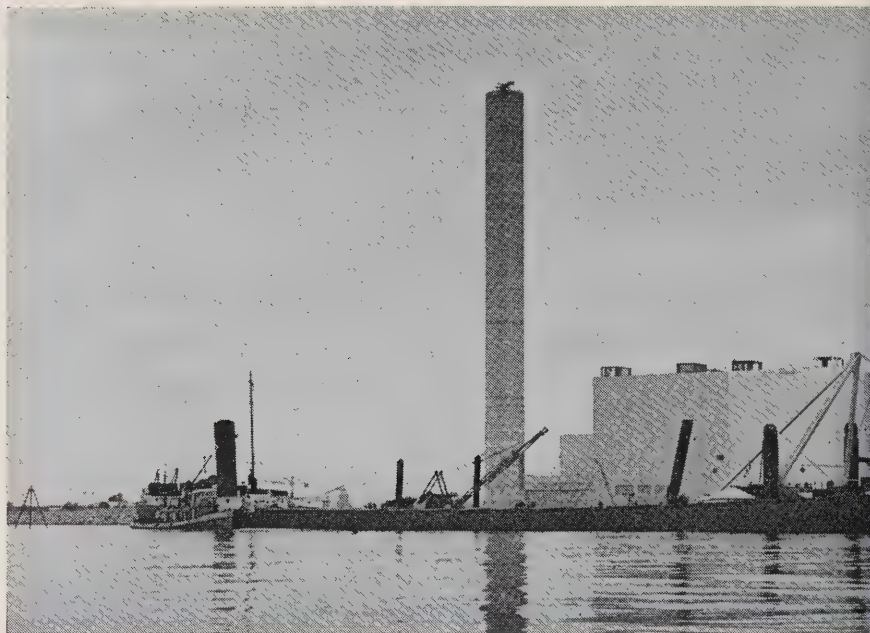
With cargoes of grain, iron ore, soybeans and stone they braved the worst the Great Lakes could offer for 60 years. And now, in their final job before the scrapyard, these three elderly freighters are still defying the elements.

Built shortly after the turn of the century, the Ridgetown, the Kinsman Venture and the Lackawanna were deliberately scuttled by Canadian Dredge and Dock Ltd. to serve as a breakwater during the dredging of a harbor channel at the site of Ontario Hydro's Nanticoke generating station.

They were towed into position, the sea cocks opened and with 13,000 tons of rock in the holds each vessel quickly settled in the shallow Lake Erie water. Once the job is done, they'll be refloated and towed away.

"We've experienced 90-mile-an-hour winds down there and 12-foot waves are not unusual," says Ontario Hydro's manager of engineering for Nanticoke, A. W. Rogers. "Putting in the breakwater allows the contractor to work continuously instead of having to evacuate men and equipment every time bad weather threatens."

The channel will extend 4,000 feet into the lake, will be 450 feet wide and is being excavated to the minimum Seaway depth of 30 feet to allow huge coal boats to dock at the \$680 million power station. The plant's eight generating units will swing into operation in stages between 1971 and 1977 by which time the station will consume an estimated 1,400 tons of coal an hour at full load. □

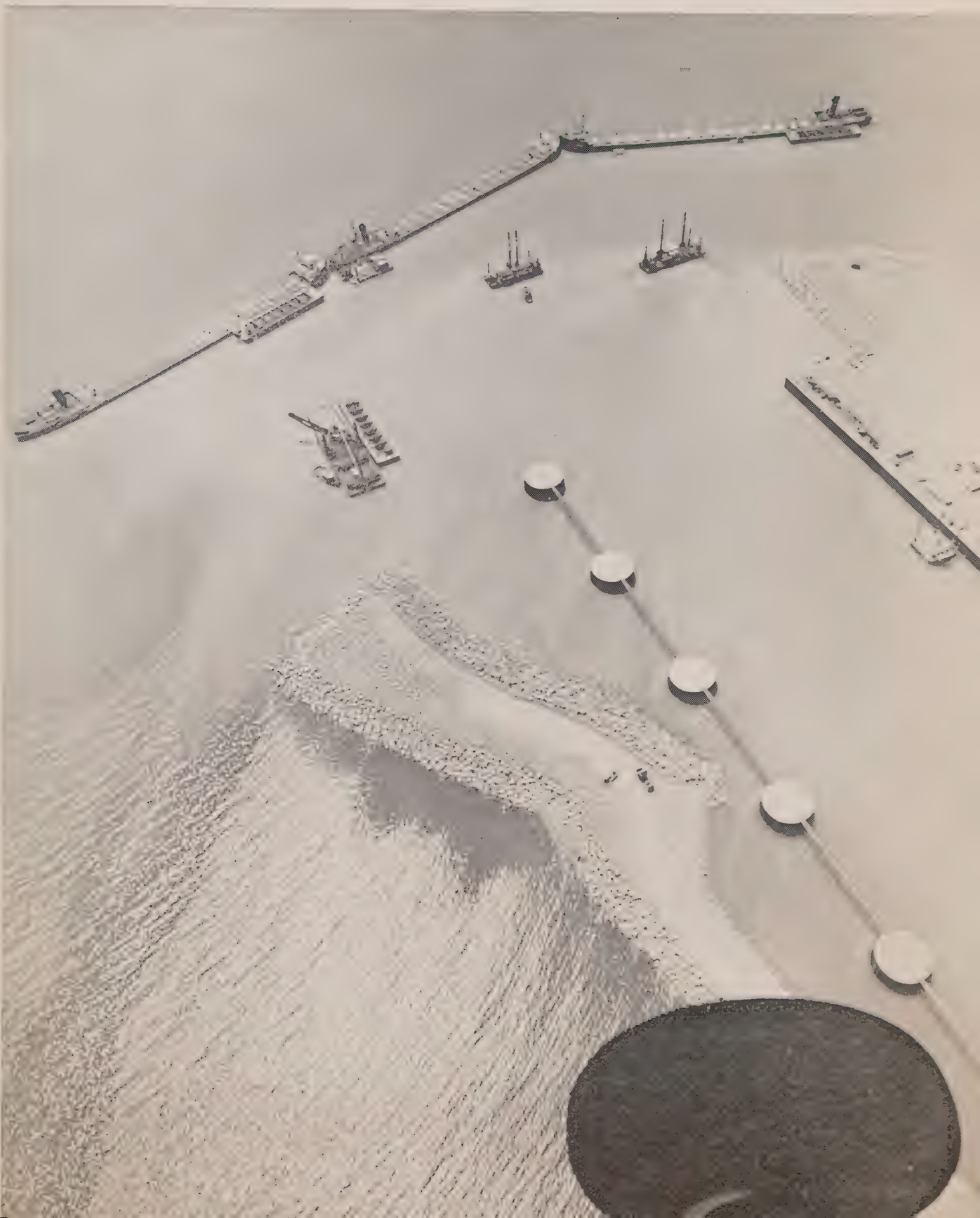


# scuttled

## but defiant to the last

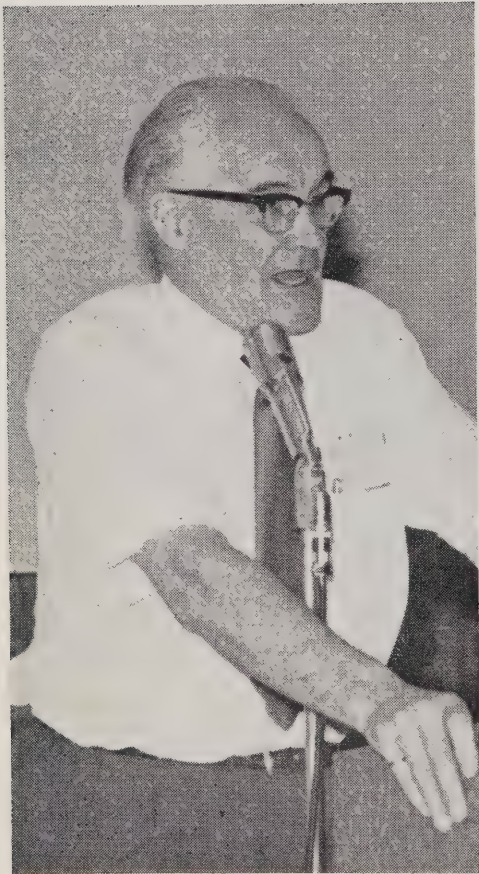


*The 650-foot stack at Nanticoke provides a backdrop for the Ridgetown, first ship to be towed into position. Below, all three ships are settled on the shallow bottom.*





# rates fund defended



Dr. Robert H. Hay

Ontario Hydro's rates stabilization fund, "despite the hullabaloo in Toronto last year, is a legitimate cost," Dr. Robert H. Hay, of Kingston, chairman of the Ontario Municipal Electric Association's power costing committee, told delegates at a District 5 OMEA meeting in Thorold.

Defending the provincial commission's maintenance of the fund, Dr. Hay said Ontario Hydro sells power at cost, which definitely makes its reserves for stabilization of rates legitimate.

"And," he added, "Ontario Hydro is prepared to lay all its cards on the table and give anyone all the answers as to why they hold these reserves."

He said the fund has five component parts, two of which go up and down automatically. He pointed out that if stream flows are good, Hydro puts money into the fund, and if they're poor, such as in 1961 when half the cottages along the Great Lakes were half-a-mile from the shore, money is drawn out.

"Back in 1961, Hydro tapped the fund for \$45 million and is still putting that money back," Dr. Hay said.

"Self insurance," Dr. Hay said, "is another major reason for having a rates stabilization fund. Hydro must insure itself against accidents such as the fire at its Chats Falls generating station, ice storms, hurricanes and other acts of God. Any organization that is large enough to self-insure can save a lot of money on interest charges," he added.

Provision is also made in the fund for foreign exchange, Dr. Hay said. "Some of Hydro's borrowing was in the US, which

means that the loans must be paid off in US currency. That means they have to scratch up more Canadian dollars to repay their US debts."

The extraordinary effects of inflation have taken another \$30 million to hold down wholesale rates for power to the municipalities, Dr. Hay pointed out. He added that the state of the economy has an effect upon demands for electricity. He said in periods of boom economy the load which Hydro is called upon to deliver always outpaces the forecasts. "And if there's a period of recession, such as we may have in right now, the load doesn't always catch up."

"All properly run local utilities also have reserves to avoid rate increases," Dr. Hay added.

In addition to his defence of the rates stabilization fund, the power costing committee chairman gave a sweeping review of the return of equity to municipal utilities.



# Incentives under fire

Energy suppliers should get out of the incentives business, OMEA delegates were told.

A debate on the merits of electric heating promotion which pitted Ontario Hydro consumer service and sales specialists against their municipal utility counterparts. Spokesmen for both organizations called for a halt to buying load by all energy suppliers.

Bill Keller, Burlington PUC's manager of customer relations, said some thought could be given by the utilities to "getting out of the incentives business." And J. C. Farrell, Ontario Hydro's rural service engineer, echoed his sentiments, calling on all energy suppliers to stop buying load through incentives.

Farrell said the incentive to install electric heating or even all-electric subdivisions is no longer an incentive but a price tag, "and a high one at that." He added there's some indication that the gas company, too, wants to get out of the incentives business.

Farrell said he didn't think it was to the benefit of the people of Ontario that energy suppliers continue to buy load through incentives for installing any particular heat source.

Other panelists included Bill Vivian, Hamilton Hydro's sales promotion manager, who called for unity within the electrical industry to promote electric heating, and P. J. Garlough, Ontario Hydro's Niagara Region consumer service sales engineer, who suggested utilities take a "long, hard look at their total promotional funds and adopt a results-oriented approach to promotional spending." □

# future still clouded

A veil of uncertainty still clouds the future of the 12 electrical utilities involved in the new regional municipality of Niagara.

W. Sam Jennings, OMEA District 5 president, told delegates at the association's meeting in Thorold that the utilities involved are "anxious to hear something that will tend to relieve the feeling of uncertainty and, to some extent, uneasiness about the future."

Mr. Jennings said Municipal Affairs Minister Darcy McKeough has requested the association's Niagara region task force to continue its studies and make recommendations concerning electrical distribution in the new municipality.

"However," Mr. Jennings said, "the big problem seems to be that in order to implement Bill 174, which sets out the method of electrical distribution in the Niagara region, and which is scheduled to become law in January 1971, a decision is required yesterday. That's to allow sufficient time to make necessary changes to integrate the commissions involved, whichever system is legislated."

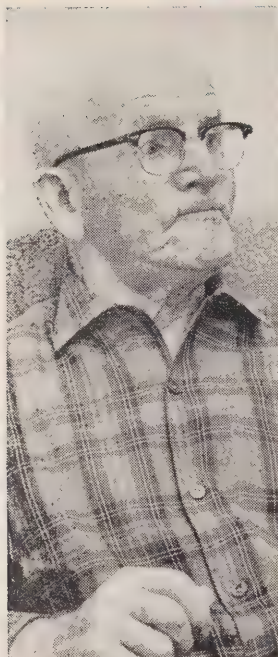
He said the undesirable alternative would be an extension of the present setup with its attendant uncertainties. □



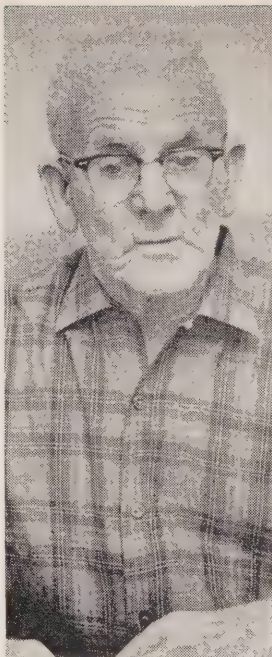
W. Sam Jennings



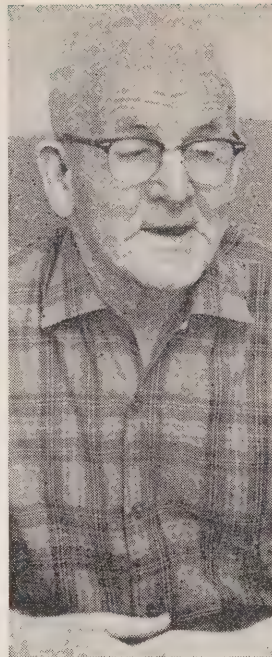
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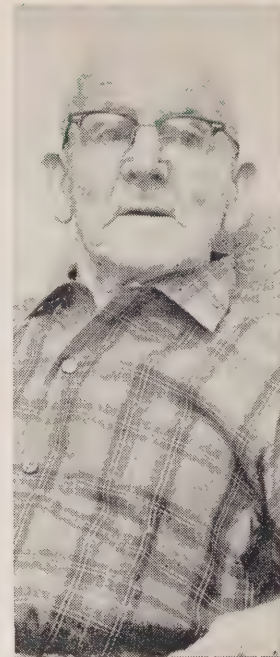
*'Rain it did'*



*'He'd fall sound asleep'*



*'Big brute threw its rider'*



*'A real man'*

Percy Price suffers a lot of pain, but he still manages to smile. And at the mention of Sir Adam or Lady Beck, the smile really broadens.

Seventy-four-year-old Percy, who about a dozen years ago suffered a spinal injury in a construction accident, lives with his wife, Elsie, in a senior citizens' home in Newmarket. He and his wife were well acquainted with Ontario Hydro's first chairman for Percy was his chauffeur for a couple of years "a long time ago – way back in 1917–18." And it's with obvious fondness that he talks about those days and Sir Adam.

He remembers, for instance, the time "around the fall of '17 when Sir Adam and I were at the sanatorium site in London – he donated a nurses' residence and a couple of buildings for the soldiers there, you know – and Sir Adam was wallowing around in mud up to his knees. It looked like it might rain and I said to him if we didn't leave pretty soon we'd never get home.

"Well, rain it did. And, boy, did it ever get cold. Before we'd gone two miles the ice build-up on the windshield of that old Packard Twin Six was about half-an-inch thick and I couldn't even see the hood ornament.

"Sir Adam told me to hold it a second while he got out and tried to clean it off. He finished up standing on the running board

all the way home, scraping like hell so we could make it.

"By the time we did get there, his clothes were frozen stiff and he could hardly get down off the running board."

Mr. Price recalls many times when he'd be out late with Sir Adam. "On the way home we'd be talking about this thing and that and he'd fall sound asleep against my shoulder. After a while he'd wake up with a start and ask what I'd said."

Nor will he ever forget the 1918 flu epidemic and Lady Beck's efforts to aid the suffering. "She was head of the Red Cross in London at the time. She'd make huge kettles of soup and go to the homes to feed the victims. I used to drive her around with it.

"Then there was the time that Sir Adam and I were in Rochester at a horse show and he'd taken two of his finest, Sir Edward and Sir Thomas, to show. There was a horse there they called Skyscraper – it was the biggest horse I ever saw. Sir Adam and I were standing by the water jump when this big brute threw its rider, cleared the jump and the fence at the end of the park and just kept right on going. Sir Adam and I sure ducked in a hurry.

"At the same show, a woman from Philadelphia told Sir Adam she had to drop out because her lead horse had fallen ill. He told her not to worry, he'd lend her one,

and sent over Sir Thomas. Well the two won the tandem event with Sir Thomas as her lead horse."

But the period wasn't notable for its events. There was a war on in Europe, times were hectic. "Ontario Hydro joined in a power pool with the US and we went back and forth from the States all the time," says Mr. Price. "They were building the Queenston plant on the Niagara River and cutting the Chippawa Canal to let water to it. We never stopped going because people needed the power."

He remembers being dispatched to Toronto every week to pick up the paymaster, drive him to a bank at Niagara Falls where they picked up the money to pay the workers. "We used to pay the men from an old converted boxcar. There was the paymaster, the bank manager and me. My job was to lick the envelopes. They were paid in cash in those days and I'd be there was at least a quarter of a million dollars in that old boxcar."

Mr. Price was also at the opening of Eugenia Falls generating station. But Twin Six was too heavy to cross the Beaver Valley bridges so while Sir Adam spent a week on the project with the chief engineer, Mr. Price stayed in a hotel.

And the last word from Mr. Price's wife, Elsie. "Sir Adam was a man, a real man," she says. □



# Music of the Spheres







*Man's understanding of the universe has been significantly enlarged by astronomical observations in the radio wavelength. The 150-foot telescope at Algonquin Radio Observatory registers emissions from the outer reaches of space.*

"Some of the gas clouds have only been discovered in the last few years through radio astronomy, and some of them were discovered through the facilities right in the park," he says.

"Our own solar system," Mr. Duston adds, "is but a very minor, and perhaps insignificant part of the Milky Way." He suggests what we see as we look toward the Milky Way is but one tiny segment of one of its spiral arms. He labels the Milky Way a spiral arm galaxy, which measures 100,000 light years in diameter.

Although our own sun is a rather ordinary star, it has been tracked by a six-foot

In the beginning, God created the heaven and the earth . . .

And from almost the beginning of time man, in his thirst for knowledge, has probed the universe in an effort to uncloak the secrets of creation.

The Pythagoreans, followers of the Greek philosopher Pythagoras who lived in the 6th century BC, believed in a kind of heavenly harmony. But Canadian astronomers today are listening to a far different kind of music — the hiss of radio signals from the outer reaches of the universe — as the search for knowledge continues.

They're doing it deep in the wilderness of Ontario's Algonquin Park with a sprawling complex of dish-shaped metal antennae set up in clearings among the spruce. This is the Algonquin Radio Observatory, built and operated by the National Research Council of Canada on the shores of Lake Traverse in the park's northeastern quadrant.

Electromagnetic waves that pass through the universe cover a very broad spectrum. At one extreme they are shorter than the diameter of an atom. Others are measured in miles. By an accident of evolution, humanity is sensitive to only one octave out of the vast scale — light.

At the observatory, scientists are mapping the sky with radio waves rather than light. Radio telescopes can "see" further into space than their optical counterparts.

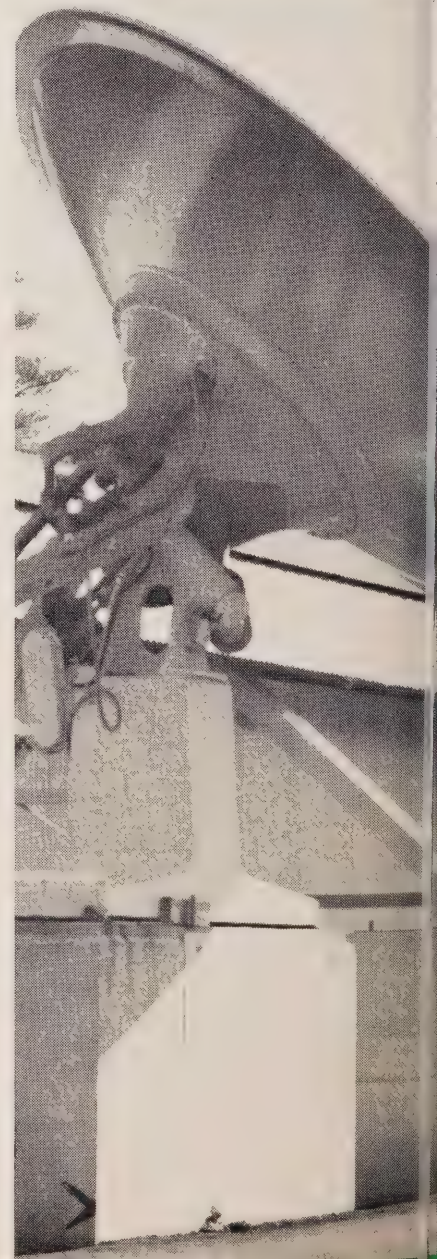
The astronomers are looking at radiation from the stars. They're tracking immense

sources of radio waves thought to be remnants of supernovae — stars that have blown up and are no longer visible, but which go on emitting energy. They're constantly watching the sun and they're trying to resolve the enigma of quasars, immensely powerful energy sources, some of which are less than one-thousandth of a second of arc in diameter, and which are believed to be way out on the fringes of the universe.

"What we're really trying to do here is find the theory that fits the facts," says Bob Duston, observatory superintendent. As an electrical engineer, Mr. Duston is responsible for the network of highly sophisticated electronic equipment at the site.

Mr. Duston points out that man's understanding of the universe has been significantly enlarged by astronomical observations at radio wavelengths. Seated in the comfortable staff house, he takes two dinner plates and holds them face to face to represent the galaxy. "As our own galaxy is saucer-shaped," he explains, "what we see when we look toward the galactic plane is part of the Milky Way edge on. In the centre it's full of stars of varying density. And there are diffuse gas clouds, primarily hydrogen, but there are traces of other gaseous materials and a lot of inter-stellar dust.

"But there's a lot more to the universe than our own galaxy. It's made up of millions of galaxies.





parabolic reflector at the observatory from sunrise to sunset since 1947. With a beam considerably wider than the solar radio disc of about 32 minutes of arc, it ensures that radio emissions from any point on the disc are uniformly received.

In addition, a multi-element interferometer, consisting of 40 reflectors 10 feet in diameter, scans the sun for sunspots. Solar flares can play havoc with communications, and with electrical systems, too.

Like the time in May, 1967, when Scott Mainbridge, district protection and control engineer at Ontario Hydro's Abitibi

Canyon site, was watching the late night news from the Timmins TV station when he suddenly received a picture from Providence, Rhode Island.

The freak reception was only one of a number of unusual occurrences that night connected with a magnetic storm which affected sensitive apparatus on the power network across Northern Ontario. It was accompanied by a dazzling display of northern lights.

Magnetic storms are attributed to major flare-ups on the sun associated with sunspots. These flare-ups hurl an intense stream of electrically-charged particles

into space. But forewarned is forearmed and the observatory is able to give advance notice of such occurrences.

Instruments at the observatory include equipment for the observation of solar, planetary, galactic, and extra-galactic emissions. But the most impressive tool on site is a 150-foot radio telescope built to register emissions from space in the shorter wavelengths. The centre of the dish is constructed of adjustable steel plates, with the outer 15 feet made of wire mesh. Its surface must hold to a tolerance of plus or minus one-fiftieth of an inch, even in high winds. Used primarily for

*Multi-element interferometer, consisting of 40 reflectors 10 feet in diameter, is used in making high resolution scans of the sun for sunspots.*





*From dawn to dusk since 1947, this solar patrol has recorded emissions from the sun. Observatory superintendent Bob Duston is shown in foreground.*



extra-galactic research, it was on this machine that astronomers discovered the very small diameter of several important quasars (quasi-stellar radio sources) whose nature and origin still remain a mystery.

All 950 tons of the big telescope are carried by the walls of the building on which it revolves on a 40-foot diameter polished track. A pillar up the centre of the structure carries a central mechanism, the master equatorial unit, which is programmed to compensate for the earth's rotation and follow the motion of a radio source across the sky.

The observatory was intentionally situated in the remoteness of a provincial game preserve to avoid man-made electrical interference. Under certain conditions, the ignition spark from a car several miles away can disrupt signals from space.

Nevertheless, electricity is vital to the operation of the observatory and a 27-mile line runs from Ontario Hydro's Des Joachims power station on the Ottawa

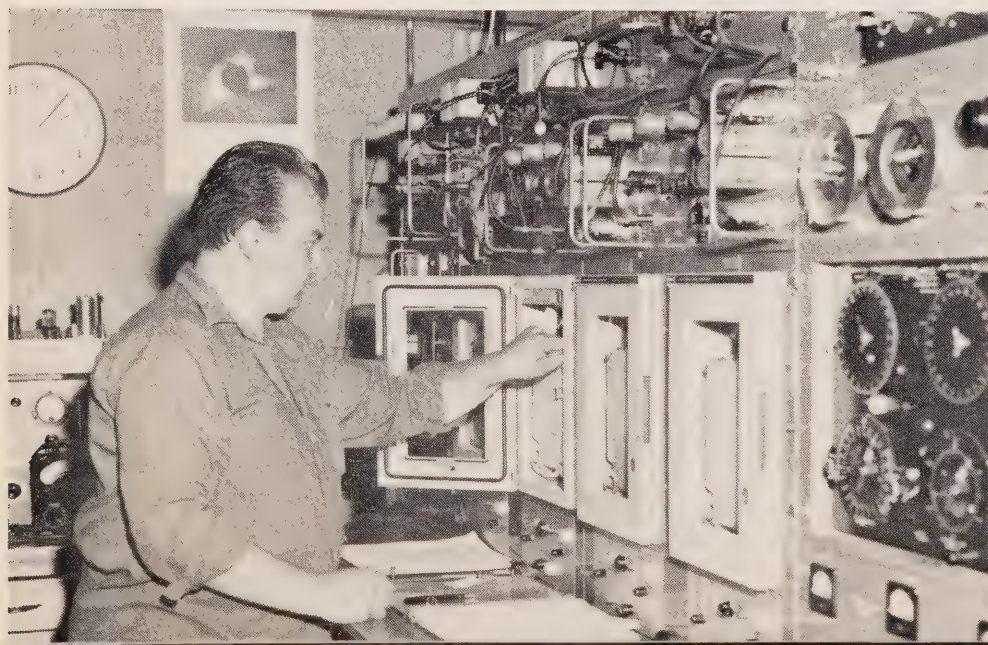
River to provide power for the living quarters and to drive the equipment.

It looks just like any other wood pole line as you drive along the rough gravel road into the observatory, but the last 10 miles of overhead line are heavily insulated to reduce electrical interference. And the final mile was placed underground for even better shielding.

There are two clocks in the main control room of the observatory. One steadily ticks off the hours, minutes, and seconds in ordinary solar time. The other counts in sidereal time – time measured by the stars, not by the days and nights of a planet which is a mere speck in the universe.

It somehow adds to the solitude in a part of Ontario where bear, moose and deer still wander unmolested. □

*Technician George Dagg checks recording equipment in the solar patrol control room.*





# along hydro lines

## Something extra

An additional \$1 million will be poured into the coffers of Bruce County and municipalities close to the Bruce nuclear power development over the next 10 years by Ontario Hydro.

The \$1 million is in addition to the grants in lieu of taxes Hydro will pay to the Township of Bruce over the same period.

Chairman George Gathercole says a task force has been studying the effect an influx of construction and operating personnel could have on the economics of the area.

He said little economic growth is foreseen to offset the population increase and the additional costs of education and services to be passed on to residents. "It would be unfair to burden local taxpayers with all the extra costs because of a development that will benefit the whole of Ontario," Mr. Gathercole said.

The task force was assisted by experts from the Department of Municipal Affairs, the Ontario Department of Education and Atomic Energy of Canada Limited.

The \$1 million, to be paid in 10 annual installments of \$100,000, is based on the total number of families connected with the Bruce development over the decade. This number will vary from year to year. At the beginning of this year, 224 families were involved. By 1975 the figure will soar to about 1,000 and will level off around 800 in 1979.

Because of the large grant in lieu of taxes to be paid to the Township of Bruce, it will not share in the supplementary payment. □

## Sulphur research

Ontario Hydro has joined several US utilities in backing a Consolidation Coal Company project aimed at developing a method of removing sulphur from stack emissions at coal-fired power plants.

Investigations already carried out by Consolidation have cost about \$500,000 and further research over the next two years will cost about \$1.6 million. Ontario Hydro's share will vary according to the number of utilities supporting the program.

The task confronting scientists involves the removal of sulphur, which constitutes 0.2 per cent by volume of all flue gases. In a typical 2,000,000-kilowatt station this would involve processing 10 million cubic feet of white-hot gas a minute.

The Consolidation process could cut the sulphur content of flue gases by 80 per cent. Laboratory tests have already achieved an 88 per cent reduction.

While extremely complex, the process is essentially a two-phase scrubber operation. The first step involves scrubbing flue gases

with small amounts of water. This removes sulphur trioxide which would interfere with later operations, and also eliminates a small amount of fly ash.

The second, a more critical phase, involves an additional scrubbing, this time with potassium formate. Phase two rids the gas of sulphur dioxide. After cooling the solution, elemental sulphur can be readily stripped off and the potassium formate reused.

But the big test — when the intricate process is hooked up to a full-scale power plant — has yet to come.

Ontario Hydro entered a similar agreement last year with 15 US utilities backing development of a program by Babcock-Wilcox and Esso Research and Engineering. Hydro itself is putting another type of scrubbing apparatus through exhaustive tests at the R. L. Hearn generating station in Toronto. □

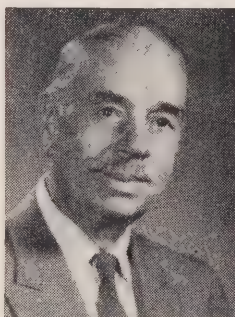
## No amalgamation

There will be no amalgamation of Ontario Hydro's Central and Georgian Bay regions.

Chairman George Gathercole says a reorganizational study of the regions, which began late last year, has been concluded and "a decision reached that there will be little change in the individual administrative operation of Georgian Bay and Central regions in the foreseeable future."

The Hydro task force took an Ontario government study, the "Toronto-Centred Region," into account while considering the amalgamation. □

## Hamilton commissioner



J. E. McLean

J. E. "Eddie" McLean, whose name has long been associated with sports in Hamilton, has been appointed to the Hamilton Hydro-Electric Commission.

He succeeds W. R. Drynan, who died last May.

A traffic consultant by profession, Mr. McLean has been active for many years in professional and amateur sport in the city and in civic affairs.

He was a centre with the former Hamilton Tigers in the mid-twenties and during the Second World War coached the Hamilton

Wildcats. He was president of the Ontario Rugby Football Union during the 1944-45 period when he coached the Wildcats.

A past president of the Hamilton Secondary Schools Rowing Association, he rowed for the Hamilton Rowing Club during his youth. Among his many community activities, he served as vice-chairman of the Hamilton Harbour Commission from 1958 until 1964. □

## Site enlarged

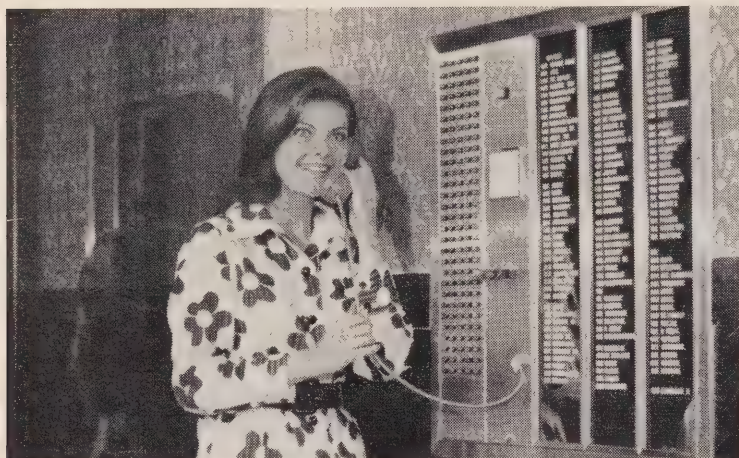
Ontario Hydro has opened negotiations with property owners to add 200 acres to its Wesleyville site, purchased in 1968 for construction of a generating station. The new acreage is located at the eastern end of the Hydro-owned property. Wesleyville is five miles west of Port Hope, on Lake Ontario.

While no decision has yet been made as to the type of plant to be built, the additional land is required for a railway spur into the property which would be built when construction begins, and to meet Atomic Energy Control Board standards should the decision be made to build a nuclear plant. □



## Phone-in

Bell Canada is marketing a new apartment-to-lobby communications system designed to increase the privacy and security of apartment dwellers.



*Well, hello there*

Called enterphone, the device operates through existing telephones and eliminates the possibility of an outsider pressing a number of call buttons at one time on a conventional intercom system in the hope that someone will let him in.

Even if a tenant is on the telephone on a regular call, he can put the caller on standby and answer the enterphone. The door release mechanism is operated by dialing a number on the phone.

□

## Tidal power 'too costly'

Harnessing the tides of the Bay of Fundy for the production of electric power isn't economically feasible during the current inflationary period, says the Atlantic Tidal Power Programming Board.

The board says in a report that a power-only development at the most attractive site would cost about \$474 million and would produce about 6.5 billion kilowatt-hours annually.

It adds that the total annual costs — including an interest rate of 7 per cent — would be \$36.4 million, or equivalent to 5.6 mills a kilowatt-hour. By contrast, existing large fossil-fuelled plants produce electricity for about three mills a kilowatt-hour.

"Even if fuel prices increase at 1 per cent a year," the board says, "this figure would only increase to approximately 3.4 mills a kilowatt-hour by 1980.

"Large nuclear plants are expected to have incremental energy costs of less than one mill a kilowatt-hour, and even lower as advanced types of reactors being developed come into use in the 1980s," the board adds.

It suggests that tidal power would become competitive with energy from alternative sources if the prevailing interest rate was dropped to about half its current value.

□

## TVA to raise rates

The Tennessee Valley Authority intends to boost rates for its two million customers in seven states by about 23 per cent, effective next month.

TVA blames "rapidly rising costs for coal in the US" for the increase. The new rates will add about \$115 million annually to revenue.

□

## On schedule

The giant \$950 million Churchill Falls (Labrador) Corp. hydroelectric development in central Labrador is "on schedule within budget," says William D. Mulholland, president of the corporation and its parent British Newfoundland Corp.

First power from the 5,225,000-kilowatt plant is slated for 1972 with completion four years later.

Mr. Mulholland says 1970 will be the busiest for construction with a 6,000-strong work force on site. Many hundreds more will be working on the fabrication of components in other centres.

To date, the value of construction contracts and purchase awards has totalled \$450 million, most of which has been spent on wages, equipment, services and supplies of all kinds in Canada, Mr. Mulholland said.

Hydro-Quebec signed a firm contract for the purchase of Churchill Falls power in May last year. The contract replaces a letter of intent issued three years earlier and will cover 65 years. It's worth about \$5 billion.

Mr. Mulholland describes Churchill Falls as a supplier of large quantities of "reliable, low-cost, inflation-proof power."

## Backing for minister

Sweeping reforms proposed by Labor Minister Dalton Bales received widespread approval by the Electrical Contractors Association of Ontario, president N. A. George told an association convention at the Delawana Inn.

Mr. George said the ECAO is "exceptionally pleased with the accreditation clause in the new Labor Relations Act and I believe that when the balance of power has been equalized that we will have industrial peace and economic stability in the construction industry."

Mr. Bales has said the amendments are designed to help curb the inflationary wage spiral, particularly in the strike-torn construction industry.

In other sessions, delegates covered such topics as marketing and the use of computers and received a crash course on critical path planning.

## Leading light

Port Colborne Hydro's float topped all entries in the centennial parade last month. Built around the theme "light leads the way," it came complete with flashing lighthouse beam, bathing beauties and a mermaid.

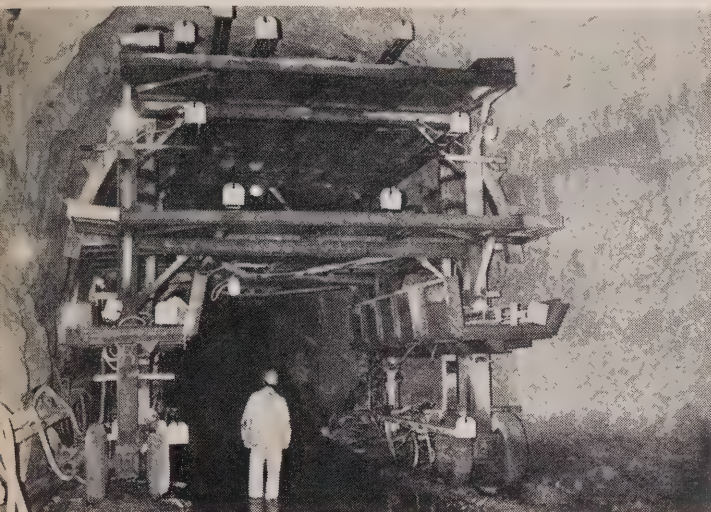


*Float afloat*



## Mine shaft?

Not quite, but it's pretty far down. More than 100 feet beneath Lake Erie workmen are hewing out the intake tunnel for Ontario Hydro's 4,000,000-kilowatt Nanticoke generating station. Work on the 1,800-foot tunnel will be completed this fall.



Man-made cavern

Between 40,000 and 50,000 yards of rock must be excavated to permit the installation of an 18-inch thick concrete liner in the 5-foot diameter tunnel. The first of its kind for Hydro, it was chosen in preference to open channels like those at the Lakeview and Lambton stations to eliminate ice problems. □

## Lakes study

Studies of the effects of heat on the Great Lakes have been ordered by the federal department of Energy, Mines and Resources. The probe was set up on the basis of a consultant's report predicting substantial heat inputs into lakes Ontario and Erie by the end of the century.

H. G. Acres Ltd. told the federal government the main contributors to thermal pollution will be nuclear and fossil-fuelled generating stations, although iron and steel mills and municipal sewage treatment systems will also have an effect.

Dr. Robert Lane, chief physicist at the Canada Inland Waters Centre at Burlington, will head one of the study groups. He hopes to have some answers before the end of this year. □

## House with a difference

A chill rain fell over Ingersoll. But it did little to dampen the spirits of those who turned out to honor Harry Burton, who, as a policeman and superintendent, served the PUC for 43 years.

Mr. Burton cut a hydro cable instead of the traditional ribbon to mark the official opening of a substation named in his honor. From the outside, the \$111,000 substation looks like any other bungalow in the residential subdivision where it stands. But the garage contains a large transformer and the house is filled with control and switching apparatus. □

## MHD study

Ontario Hydro has signed agreements with a University of Toronto professor to study the feasibility of magnetohydrodynamics (MHD) as a means of generating electricity.

Dr. Stanley J. Townsend will provide a state-of-the-art survey

of MHD power generation technology and a follow-up report a year later.

MHD is the term used to describe electric generating systems which obtain power from conducting fluids as they move through magnetic fields. Utilities in the US, the Soviet Union, Japan, Poland, Britain, France and Germany have been active in this field. □

## Expropriation bid

Ontario Hydro has applied for permission to expropriate 27 properties in Seneca, Oneida, and Walpole townships for a transmission line leading from the Nanticoke generating station, due to start up next year.

Negotiations began with owners of the properties between Jarvis and Middleport in February after township authorities approved the proposed route. Of 80 parcels involved in the 25-mile section between Nanticoke and Middleport transformer station, settlements have been made with 53 owners. □

## My adobe hacienda

"'Twas in a little Spanish town, 'twas on a night like this . . ." go the words to the hit tune of yesteryear. And a little Spanish town made a big hit with visitors to this year's Canadian National Exhibition.

Sponsored by the Metro Toronto utilities, "Spotlight on Spain," in the CNE's Better Living Centre, featured a multi-screen tour of this European tourist mecca and a preview of Spanish fashions. Fashions for better electrical living, too, drew their share of the limelight, with intermittent exhibitions of Spanish dancing to the strains of flamenco guitars and a theatre organ.



Ole . . .

Dancer Paula Moreno made the trip across the Atlantic to head the show and Borough of York Alderman Robert Hewitt journeyed across Toronto to take a few dancing lessons for fear a pinch-hitter was needed. He wasn't called upon to perform, though. □

## Felony foiler

When it comes to fighting crime, municipalities in the Montreal area are just one big happy family – thanks to the wizardry of integrated circuits. A new police and civil protection communications network has been installed, and it forges an instantaneous voice link between all enforcement agencies within a 50-mile radius of the city.

With the help of electronic switching equipment at Montreal police headquarters, each of the city's six police areas are served



by one channel. In an emergency, any one of 10 dispatchers can alert all police cars in the districts simultaneously. And patrolmen can listen in to a car-originated call without the dispatcher having to relay the information. Six more channels can be added as the city expands.

Located in the same building, the civil protection network incorporates 10 channels. Montreal Island has two and the others reach north to Ste. Agathe and east to St. Hyacinthe. The provincial police and the RCMP also have channels.

The idea of the integration is to thwart criminals skipping from one municipality to another. □

## Nuclear school

An Ontario Hydro contract worth about \$100,000 has been awarded to Markus and Son, Limited, Pembroke, for expansion of the Nuclear Training Centre, near Rolphton.

The addition will include a new wing and alterations to the existing structure. The modifications will expand the changing rooms and laundry at the centre, which is used to train personnel to operate nuclear plants.

Two nuclear power plants — Bruce, at Douglas Point on Lake Huron, and Pickering, 20 miles east of Toronto on Lake Ontario — are being built to meet Ontario's power needs. Most of the personnel on course at the centre will be absorbed by these two generating stations.

Only a year ago, extensive additions virtually doubled the original centre's capacity to accommodate more than 150 trainees at one time. Established in 1962, the centre has trained more than 500 persons, some of them from other countries where nuclear plants using the Canadian-style reactor are being built. □

## Hall of famer

Gordon Allan "Phat" Wilson, rated by many as the finest hockey player ever to come out of the former city of Port Arthur, and one of the all-time greats of amateur hockey in Canada, has died at the age of 74.

A former Port Arthur PUC superintendent, who became a commissioner after his retirement, Mr. Wilson never played professional hockey. It wasn't that he couldn't have — he turned down numerous NHL offers to remain an amateur because of his interest in helping youthful players with their game.

He was a standout on all three Port Arthur Allan Cup champion teams of the 1920s and was named to Canada's Hockey Hall of Fame in 1962.

When his playing days were over, Mr. Wilson managed and coached local junior and senior hockey teams. He was elected Honored Senior Sportsman by the Royal Canadian Legion in 1960 and was first president of the Port Arthur Little League. He later became Little League commissioner for Northwestern Ontario.

In addition to fostering hockey, "Phat" was also active in Little League baseball promotion. He was former president of the local chapter of the International Brotherhood of Electrical Workers and in 1950 was appointed to the IBEW's law committee in Washington.

He is survived by his wife Rita, two sons, Conrad, of Winnipeg, and Gordon Jr., of Thunder Bay, and a daughter, Mrs. Paul (Mona) Joy, of Thunder Bay.

In a tribute to Mr. Wilson, Thunder Bay Hydro Chairman Jim Currie said: "He gave us tremendous service both as superintendent and as a commissioner for 10 years. No task was ever too small for him, he had a perfect attitude. Phat Wilson will certainly be missed." □

# municipal briefs

**Among the utilities** employing infra-red equipment to check their electrical systems are Stratford and Woodstock. A t mounted infra-red scanner checks for overheating problem power lines, switches and connections.

**EUSA manager** H. G. Flack has urged utilities to refrain using barehand live-line maintenance techniques on lines gized below the 15kv level. In a letter to all utilities, he "Generally, existing configurations and clearances of lines gized below 15kv do not permit the use of barehand live techniques. Live-line work on lines energized at or below 15kv level should only be carried out by rubber-gloved ha live-line tool methods."

**Thunder Bay Hydro** has named Colin M. Nicholson, a 20 employee of the former Port Arthur PUC, as its new treasure succeeds Donald Shipston, who has moved to London as comptroller.

**Thunder Bay Hydro's** general manager, E. A. Vigars, will ta early retirement next year. Mr. Vigars began his career with Arthur PUC 24 years ago as assistant manager. In 195 became manager-secretary. He was appointed general ma with the formation of Thunder Bay Hydro.

**North York Hydro** has a new operations engineer. He is Gilmore, former chief engineer with Thunder Bay Hydro Gilmore was previously with the Port Arthur PUC for 16 ye

**Toronto Hydro** installed nearly 50 miles of underground duct last year, according to the annual report. This include construction of 101 manholes and 21 underground transf vaults.

**St. Thomas PUC** superintendent Lorne D. MacVicar has d the age of 63. He joined the PUC in 1936 and was app Hydro superintendent in 1957. He became superintende both electrical and water services in 1968. Mr. MacVi survived by his wife Helen, a son William, a brother and grandchildren.

**A seven-month dispute** over buildings owned by Thunde Hydro after the amalgamation of the former cities of Port and Fort William has been settled. After a day-long meeting Municipal Affairs Minister Darcy McKeough, city coun purchased Thunder Bay Hydro's Donald-May streets buildin its Vickers street service centre for a total of \$477,000. I will continue to manage its present Whalen building, bu will be transferred to the municipality.

**For Sarnia Hydro** appliance salesman Charles Perrie, selli really paid off. During a recent Canadian Electrical Manufac Association-sponsored promotion on frost-free refrigerato won a two-week, all-expense-paid trip for himself and hi to Barbados.

**Trenton PUC employees** have returned to work after a two-strike, the first walk-out in the history of the utility. The cor sion and its employees agreed on a two-year contract whic give outside workers a 40-cent-an-hour pay boost in th year and an additional 8 per cent in the second. Inside w will receive a 13½ per cent increase in the first year and a 26-an-hour hike in the second.





## as don wright sees it

With another Labor Day gurgling off to stern, nautically speaking, a comment or two may be in order on matters relating to the working man and his valiant efforts to maintain the upward spiral in the price of his sweat.

In the case of crane operators, sweat is hardly the right word. Even perspiration is too earthy a way to describe the precious fluid which exudes from the pores of the people who hoist things about at Ontario construction sites. As the result of their recent \$3 an hour wage and fringe benefit boost, these lunch bucket aristocrats stand to make up to \$21,000 annually.

That's a lot of bread and it puts the boys in roughly the same financial category as a university professor or the engineer in charge of a large construction project. Who needs an iron ring or a sheepskin when you can skim off the cream with a union card? If you don't mind pulling a few levers, that is.

Actually, there are only a few hundred crane operators in the province and, left to their own devices, they seem likely to hoist themselves on their own petard, so to speak. Another lift like the last one and the contractors are likely to lower the boom. After all, the Egyptians managed to build pyramids nearly 500 feet high at a time when the only cranes available were wearing feathers.

■ Far more alarming, to our way of thinking, is the distaff side of the labor movement and the high-pitched cry of the feminist in hot pursuit of love, liberty and whatever else happens to be available. And don't think the danger is any less because their goal appears fuzzy and ill-defined by male standards. Logic is one thing — intuition something else. These girls may not know exactly what they want, but they sure want it bad. Anyone who saw those determined ladies marching two abreast each down Fifth Avenue during a recent demonstration knows they mean business.

Our only personal encounter with a professional woman (feminist) occurred the other day on a visit to the bank. Waiting at the wicket while the rather sad-faced teller sorted through a pile of cheques with one hand and rolled a cigarette with the other, we were intrigued by a gong slightly smaller than a hub cap dangling by a long chain from her neck. It bore the words "We want equality."

"What are you really after?" we were moved to enquire and that was a mistake.

"Just what the button says," she replied with a casual gesture in the direction of her navel. "We intend to be even more equal than men. We want

to sever the umbilical cord binding us in subservient fashion to the male."

Startled but reassured by a surreptitious glance downward that there was nothing physical between us, we considered it prudent to keep strictly to business. Extending a \$2 bill, we inquired as to the bank's ability to break it down into something smaller and more manageable. This she ignored and got down to more important matters.

"Why should I have to wear a brassiere in this day and age?" she demanded, and she had us there. On her, the garment did seem redundant. All it appeared to be holding up was tradition. Fortunately, she didn't wait for an answer.

"Look at this miniskirt," she pressed the advantage, "men like you want me to take it off."

Shaken by her prescience for a moment, we were relieved when she went on to explain how male fashion designers were a thoroughly bad lot bent solely on imperialistic-type profits in their drive to lower hemlines. Here was firmer ground and we were quick to extend congratulations on the stand her people were taking to keep the minis out of the mothballs.

"We want to wear the pants," she was about to go on, but people were beginning to stare and we fled with our big banknote intact.

■ Whether or not that much-publicized, one-day strike by the liberation movement to deprive the male of a variety of goods and services normally provided by the ladies was a success we wouldn't know, and we didn't ask the teller. Certainly, a more prolonged withdrawal of services could lead to a general male uprising.

At the same time, the feminists would be wise not to overdo the one big biological advantage they have always enjoyed in the battle of the sexes — the ability to have babies. Speaking about the new Ontario legislation to end job discrimination against females, one liberation movement leader said in Toronto the other day: "There is no reason why women shouldn't be paid for maternity leave. After all, bearing children is one of the most important functions in our society."

Maybe so, but they may be overdoing a good thing. Statistics indicate that two new human beings are added to the world population every second. At present there are 3,680,000,000 people in the world and this number will double within 35 years.

According to one eminent biologist, within a mere 500 years there will be so many people on earth that a building will be required to house them covering the entire surface of the globe including the oceans and ice caps. Algae produced within its confines will be the sole source of food and there will be no room for any other kind of plant or animal anywhere.

Reading this kind of stuff leads one to the conclusion that man isn't exactly a rare specimen and that there are more immediate things to worry about than his proliferation. Aside from running out of space, and scientists figure the standing room-only sign will go up about the year 2500, consider the waste disposal problem.

That's why some ecologists figure the only solution to pollution is to be found in the bedrooms of the nations. The way they see it, that gleam in father's eye can only be interpreted in terms of more detergent and new generations of empty plastic bottles.

■ Disturbing as it may be, militant femininity should be countered with caution by the male and guerilla warfare is likely to be more effective than the kind of blind backlash exhibited by that US government analyst with the department of labor. This outspoken lawyer-economist-bachelor publically blamed female dominance for a wide range of disorders among men including schizophrenia, paranoia, suicide, alcoholism, cancer, arthritis, sterility, dwarfism, crime, homosexuality, diabetes, colds, delinquency and headaches.

We have our doubts. There simply isn't enough evidence as yet to ascribe every instance of dwarfism to an over-bearing female.

■ Environmental alarmists were temporarily shaken in recent weeks by two setbacks. The first blow fell when Professor Merrill Eisenbud of the Institute of Environmental Medicine, New York University Medical Centre, announced that radiation from nuclear power plants was minimal and insignificant as far as public exposure was concerned. Speaking before a symposium at UN headquarters, he was reporting on a study of all 21 operating civilian nuclear power plants in the United States. He said the study indicated that environmental radioactivity should not be a factor impeding the development of this form of power.

Even more shattering to the purveyors of doom and gloom were the results of a three-year study by a number of US government agencies relative to the state of the world's oxygen supply. Depressing as it may be, and in spite of all the pollution we've done and the vast amounts of coal and other fossil fuels we have burned, the amount of oxygen in the earth's atmosphere has remained essentially constant over the last 60 years. What's more, the study suggests that if we proceeded to burn all of the world's resources of these fuels it would have no appreciable effect on the oxygen supply and our ability to breathe.

Fortunately, the significance of these reports was quickly recognized and they were given little prominence. Rays of sunshine like these have no place in a philosophy which has us all earmarked for an early grave beneath the reeking heaps of our own affluence and neglect.

■ We have had more than one occasion to bring the sneaky and nefarious practices of the gas utilities to the attention of our readers and each instance appears more underhanded than the last. Oddly enough, the most barbarous of these practices appear to originate in England. That flu epidemic that ravaged the ranks of electric meter readers last winter while leaving their gas counterparts untouched was a case in point. Now they're exploiting sex.

According to a news service dispatch last month, the scheme was discovered by workmen piping "a new kind of gas" into homes near Harrogate. "It's very strange stuff," one of the men is quoted, "it makes you feel drunk and then gives you a heightened sexual feeling. A lot of the lads have been talking about a better love life."

If the report is true then Hydro is in for a tough time. Electricity may be better for heating, cooking, lighting and all the rest of it, but it's a poor substitute for sex and booze. □



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**ontario hydro news**  
october/1970



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### the cover

It looks cold. But construction of the DC line that will transmit power at 900,000 volts from the Nelson River in Northern Manitoba to Winnipeg is essentially a winter job. Ontario will benefit from the project from 1972 (see article starting on opposite page).

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## Ian F. McRae

Retirement was furthest from the mind of Ian F. McRae when in 1965, at the age of 61, he stepped down as chairman of the board of Canadian General Electric. Within a month he was appointed an Ontario Hydro commissioner and on October 1 last year he was named second vice-chairman.

Mr. McRae never did retire. He was still Ontario Hydro's second vice-chairman at the time of his death in Toronto earlier this month.

Shortly after his appointment to the Commission, Mr. McRae said in an interview that he retired early from CGE and "applied to the Hydro people" to continue his 40-year association with the electrical industry.

Fittingly enough, he became a commissioner at a time when Ontario Hydro was turning increasingly to the atom for power. Nothing could have been more suited to his experience — he was general manager of CGE's atomic power department from its inception until 1965.

One of his last official duties for CGE was to sign a \$60 million contract in Karachi for a 137,000-kilowatt nuclear power station in Pakistan. The station was the first nuclear power project to be developed by private Canadian industry and represented one of the largest export contracts received by a domestic manufacturer.

Born in Vancouver on July 24, 1904, Mr. McRae was the son of a ship captain on the Pacific coast. He received his early education in his hometown, then briefly tried mining in Alaska before joining CGE in 1925.

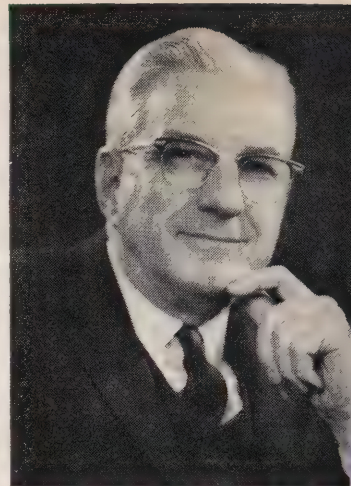
He used to say he "came east to take a CGE apprenticeship course with the intention of returning to Vancouver to seek employment when I was finished." But that absence lasted 45 years.

Although he never attended university, Mr. McRae qualified as an engineer and progressed through CGE's engineering department to become manager of the Peterborough works in 1941. He was then assistant to the vice-president, manufacturing, at the company's headquarters office in Toronto in 1950; loaned to the Department of Defence Production to head its guns division in 1951; became a CGE vice-president in 1952; general manager of the atomic power department in 1955; a company director in 1957 and chairman of the board a year later.

Laval University conferred an honorary doctor of science degree upon Mr. McRae in 1959.

Mr. McRae was a member of the Ontario Economic Council, the Association of Professional Engineers of Ontario, the Engineering Institute of Canada, past president of the Canadian Industrial Prepress Association, past president of the Canadian Nuclear Association, past president of the Canadian Manufacturers' Association, and past president of the Rotary Club of Toronto.

Mr. McRae is survived by his wife, Lena, a son, Robert, and a daughter, Mary. He also leaves a sister and brother.





# north of the 56th



**Ontario homes and industry will ultimately benefit from the harnessing of the mighty Nelson River at Kettle Rapids, almost on the shores of Hudson Bay.**

by Les Dobson

limming the stunted spruce that somehow manage to survive above the 56th parallel, the yellow and brown turbo-prop planes prepare to touch down at the isolated community of Gillam in northern Manitoba.

Every seat aboard the twin-engined plane is occupied. "I've never seen this flight when it wasn't full," says the pretty blonde stewardess, who gave up her own place to make room for an extra passenger — a French-Canadian construction worker from Thunder Bay.

Most of the passengers will alight once the aircraft has taxied to a halt after landing with a crunch on the mile-long gravel strip. A few will make the additional half-

hour trip to Churchill, on the shores of Hudson Bay.

Gillam earned its place on the map as a stopover point for CNR crews hauling grain to the port of Churchill. For years it had a population around 300. Today, a vital community of 1,800 souls, it has received a remarkable transfusion from the harnessing of the nearby Nelson River for power purposes.

A mighty river, the Nelson. It drains a vast area from the head of the Great Lakes to the eastern foothills of the Rockies. Its basin embraces large areas of Alberta, Saskatchewan, Manitoba and Ontario and reaches southward into North Dakota, Minnesota and Montana. At Kettle Rapids, site of the giant Manitoba Hydro develop-

ment, the waters swirl almost a mile wide muddied a chocolate brown by run-off from the uncharted tracts of muskeg bordering the river's lower reaches.

A harsh land is this. The longest days fade grudgingly into midnight and the longest nights are relieved only by the shifting, shimmering hues of the aurora borealis. Temperatures range from the nineties in the short summer to fifty below in winter, although the snowfall is mercifully light.

And then there are the bugs. Blackflies and mosquitoes proliferate. But there is also the monster known locally as the bulldog, whose bite is far, far worse than his bark. "Rather large houseflies," Prince Philip was heard to observe with





typical British understatement to Prince Charles during the recent Royal visit to the Kettle site.

No road dissects this awful yet fascinating region. Winnipeg is thirty hours distant by rail — three trains up, three trains down a week. Yet from this country of forests and swamp, permafrost and polar bears, will come the power to heat homes and turn the wheels of industry in more hospitable climes.

While the Kettle project will have a capacity of 1,224,000 kilowatts — almost as much as the present Manitoba system — the provincially-owned utility has eager customers waiting on three sides. To the west it is interconnected with Saskatchewan and to the south with an organiza-

tion of US utilities known as the Mid Continent Area Power Planners. And to the east, there's Ontario.

Power from Manitoba is already being fed into the Ontario Hydro system and from 1972 onward, an agreement between the two utilities calls for 50,000 kilowatts in the first year, 100,000 from 1973 to 1974, 200,000 from 1974 to 1977 and 100,000 kilowatts from 1977 to 1978. Faced with the expensive alternative of building thermal-electric generation, purchase by Ontario Hydro of this low-cost hydro-electric energy will mean considerable savings.

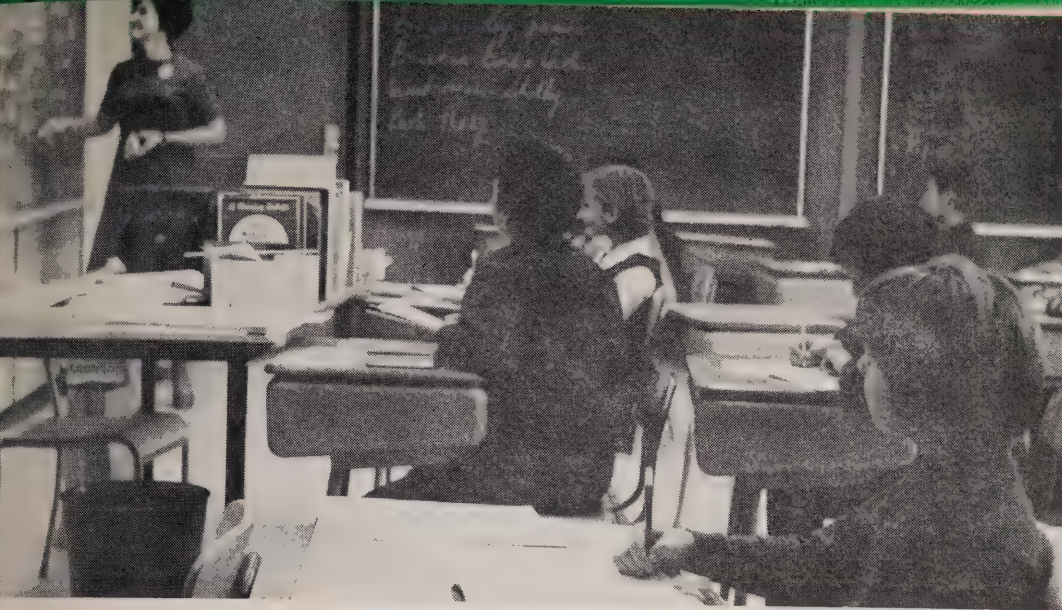
Electricity generated on the Nelson River will be transmitted 560 miles to Winnipeg along a 900,000-volt DC line. This line,

being built by Atomic Energy of Canada Ltd. and paid for by Manitoba Hydro over a 50-year period, will share the distinction of being one of the few direct current transmission lines in the world. It will certainly be one of the longest.

The southern two-thirds of the line is already built. The remainder will be completed this winter once the muskeg is frozen over and heavy equipment can be moved into the right-of-way. Elaborate conversion stations, to change the AC current to DC and back again, are nearing completion at the northern and southern terminals.

The decision to build a DC line was based on economics. DC transmission lines require only two conductors com-





*Gillam earned its place on the map as a stopover point for CNR crews hauling grain to the port of Churchill. Now it's a thriving community of 1,800 where life — and school — goes on much the same as anywhere.*

ed with three for the conventional  
ee-phase AC circuit. This leads to a  
ing both in conductor and insulators  
d in the strength of the towers. Line  
ises are also cut because of the reduc-  
n in the amount of conductor required.

its part, Ontario Hydro is spending  
million on transformation and switch-  
equipment and the construction of  
re than 300 miles of 230,000-volt  
mission line that will loop from the  
nitoaba border through Kenora, Dryden,  
tokan and Fort Frances. The southern  
of the loop will be ready in 1972.  
northern half will enter service two  
s later. Together, they'll bolster sup-  
s in Northwestern Ontario as well as

providing power for customers further  
south.

Meanwhile, the building of the Kettle  
station runs precisely to schedule. Working  
two 10-hour shifts, six days a week, the  
1,500-man construction force is putting  
the finishing touches to the main dam  
and has completed the powerhouse for  
seven of the 12 proposed generating  
units. The first four units will come on line  
next year.

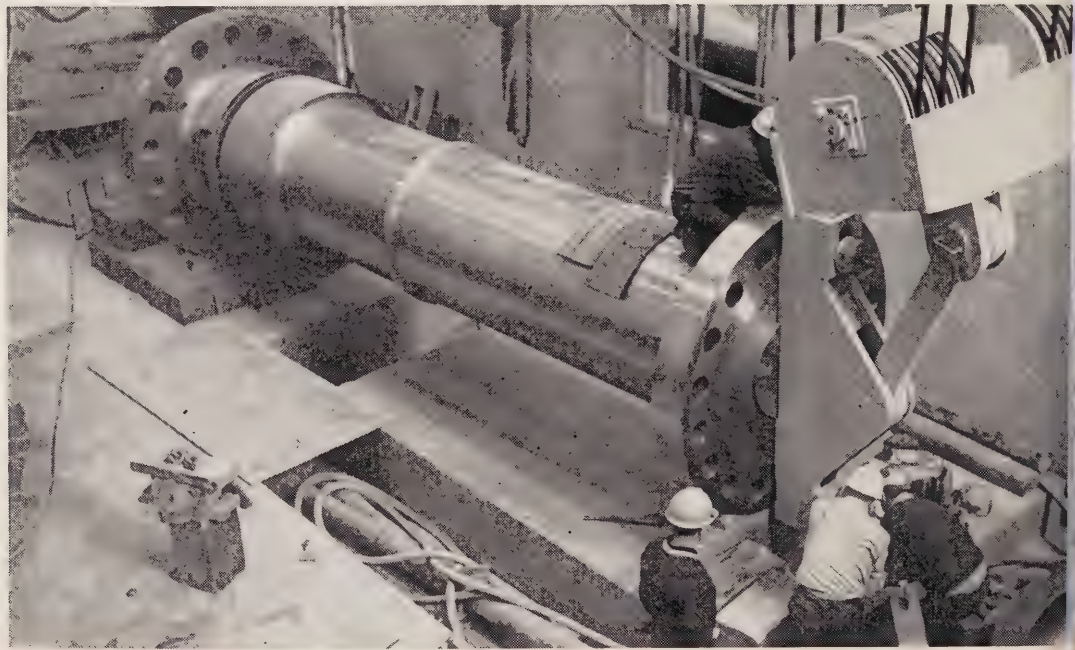
Even the Kettle camp's excellent food and  
board don't compensate for the hardships  
of life in the bush. But they help. "Food is  
always the first target if there's any  
unrest," says camp administrator Lloyd  
Wheating. "So we make sure the men  
have a couple of representatives on the

catering committee. We also get an  
independent report on the quality of each  
meal, one copy of which comes to me  
and the other goes to the chef."

But the big attraction is the money. Most  
contractors sign up their employees for  
three months at a time, providing free  
accommodation, free meals and the return  
fare to Winnipeg. "It's possible to save  
up to \$300 a week," said one worker, a  
foreman with a wife and five children living  
in Ontario. "Of course, I mail it straight  
back home and don't get involved in any  
poker games."

Life takes on a more tolerable and  
permanent aspect for Manitoba Hydro  
employees and the senior personnel with  
the major contractors. It must. For their





*Every piece of equipment from huge turbine shafts to the last nut or bolt has to be shipped by rail to the Kettle site. Right: the main dam nears completion.*

tour of duty is measured in years rather than in months. Most of them live four miles from the site at Gillam in mobile homes or in spacious three and four-bedroom houses that will ultimately be occupied by operating and maintenance staff.

The tiny community has experienced a dramatic facelift since Hydro moved in. Within four years it has acquired a modern hospital – the maternity ward is the busiest – a 14-classroom school, a Local Government building and a \$1.2 million recreation centre complete with auditorium, hockey and curling rinks and bowling lanes. A shopping centre supplies most of the trappings of civilization, from bottle openers to power lawnmowers. The village supermarket is run on a co-

operative basis by the residents themselves.

Such essentials as street lights, pay telephones, water mains and sewers have appeared. All services are buried 10 feet deep and the water system is heated to prevent the mains from freezing solid.

"Originally, the village consisted of about 50 Whites and 250 Indians and Metis," says Mr. Wheating. "We decided to superimpose the new community on the old rather than build it several miles away and create a sort of ghetto."

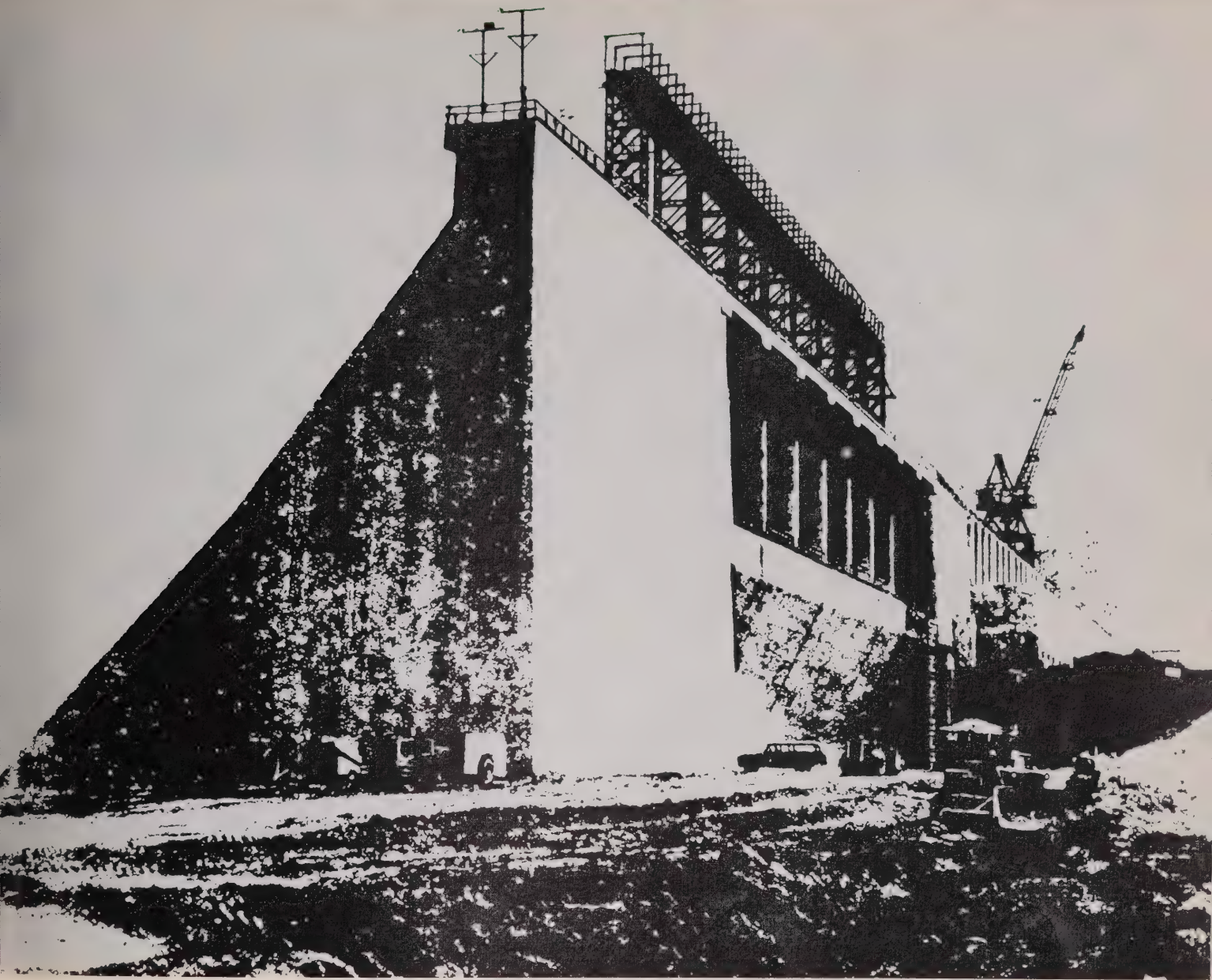
Somehow, life in this remote spot acquires much of the pace of the city. For one thing, there are the long working hours. Then it's a constant round of house parties, visits to the recreation centre,

committee meetings and fishing trip. Motivated by the need to go somewhere even if it's only to the next lake, several employees recently bought their own aircraft. The snag was that not one could fly. However, they brought in an instructor from Winnipeg and within a few weeks they each had their private pilot's licence.

In winter, there are snowmobile trips into the bush – usually in convoys of five and six vehicles for safety's sake. A one party of adventurers even made a 70-odd miles along a frozen transmission line right-of-way by car to the nearest town.

Large as it is, the Kettle project represents only a fraction of the Nelson's total electrical potential of about seven million





lowatts. Several other sites, the largest of which is Limestone Rapids with a potential of 1,840,000 kilowatts, may be developed by building power dams at key junctures in the river, converting long reaches of rapids into concentrated falls.

But to do this, the waters of the more northerly Churchill River must be diverted to the Nelson – a proposal which raised a political storm in the Manitoba legislature. Protests came from ecologists over the raising of the level of Southern Indian Lake, which would be dammed at its outlet to the Churchill River. In addition, the project would involve the relocation of 77 Indian families living in 10 small communities on the lake.

As a result of public hearings, it was decided to delay plans for the diversion until the scheme and various alternatives had been studied in greater detail. It now appears any diversion will not raise the level of Southern Indian Lake more than 10 feet, at which point the settlements will be unaffected.

One thing is clear, however. The Nelson ranks as one of Canada's largest undeveloped energy resources. And in this age of environmental concern, hydro-electric generation is by far the most attractive of all power options. □



# Is there a doctor in the house?



**In the small town of Deep River, there well might be.  
For 130 of its population are Ph.Ds.**

by Rae Hock

A war memorial stands in silent watch over the municipal building, and immediately in front of it the well-manicured lawn slopes gently toward the river's edge. Not so much as a discarded gum wrapper dares disturb its rich green broadloom-like appearance. Just offshore small craft, with and without sails, bob lazily on the broad Ottawa.

No name has been etched upon the stone. The town — which owes its existence to the establishment of a nuclear power industry in Canada — wasn't born until the close of the Second World War.

Deep River, Ontario, is now home to 5,700. But what makes this small community even more remarkable is that 130 of its population carry the letters Ph.D. after their names. And through the years,

Deep River has been a second home to hundreds of scientists from all over the world.

Despite its host of highly-qualified people, the town doesn't know the meaning of class distinction. Says Mayor Peter McConnachie: "In this town the janitors and the Ph.D.s fish together and it's not uncommon for them to sup a cool draught or two together afterwards at the Elms or the Legion."

From its very beginning, the town has been a planned community. It was virtually created overnight to serve as a dormitory village for a top-secret plant involved in the extraction of plutonium. Today, this plant is known the world over as Atomic Energy of Canada Limited's Chalk River Nuclear Laboratories — and has since put

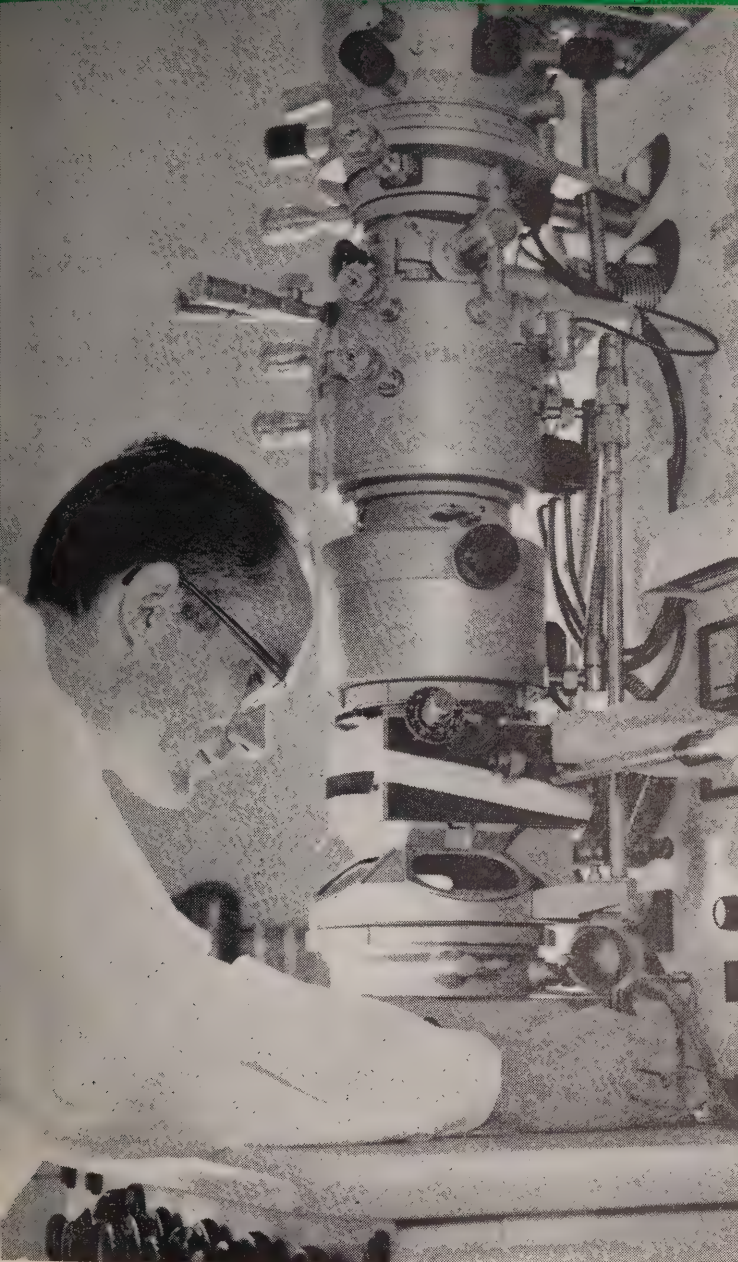
Canada among the world leaders in the peaceful development of nuclear power.

Little of the pioneering spirit of the first immigrants who hewed their tiny settlements out of the bush in the Ottawa Valley was evident in the development of Deep River. The first residents here were pioneers in nuclear research. All the essentials of life were provided.

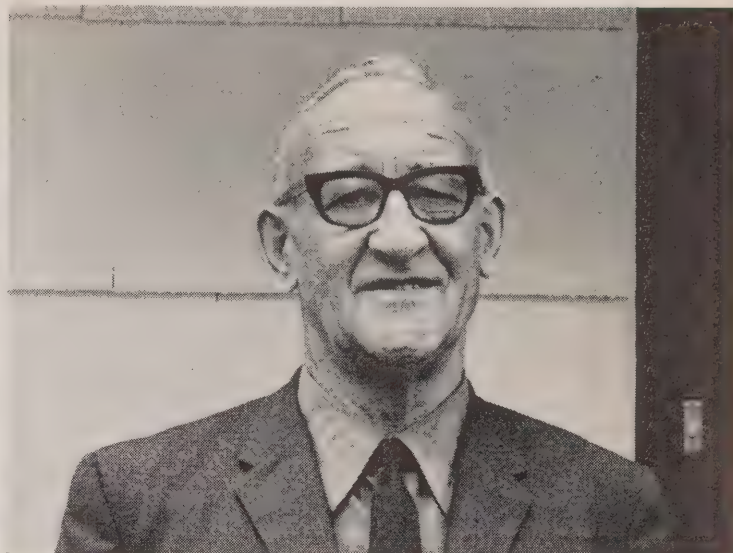
The beautiful location was further enhanced by careful design by the town planning department of McGill University. Full use was made of the natural contours of the land with the central area and the waterfront left open as its focal point.

Mr. McConnachie, one of the "original planners," says the town was planned for living and with children in mind.





*living at Atomic Energy of Canada Limited's laboratories and even Mayor Peter McConnachie, below, is an AECL pensioner. The MacKenzie High School is only one of many buildings in town which rely on electric heat.*



"It's not unusual to have to stop your car on any of our streets and move a tricycle off the road," he says. "We have no sidewalks here and it's almost impossible to speed. Of course, our speed limit's pretty low — 25 miles an hour — and you can drive around here for weeks and no one will ever move out to pass you.

"Y'know," he adds, "there must be something to that planning. Between June 1945 and June 1970, there were 4,853 Canadians with Deep River on their birth certificates. And they're a pretty right bunch. Our kids have won more Ontario scholarships than students from any other community in the province."

Every smile crosses his face as he talks about the youngsters that not infrequently

visit his office to demand action — "something's gone wrong in the playground, like a broken swing or what have you. They know their rights and they sure won't be pushed aside."

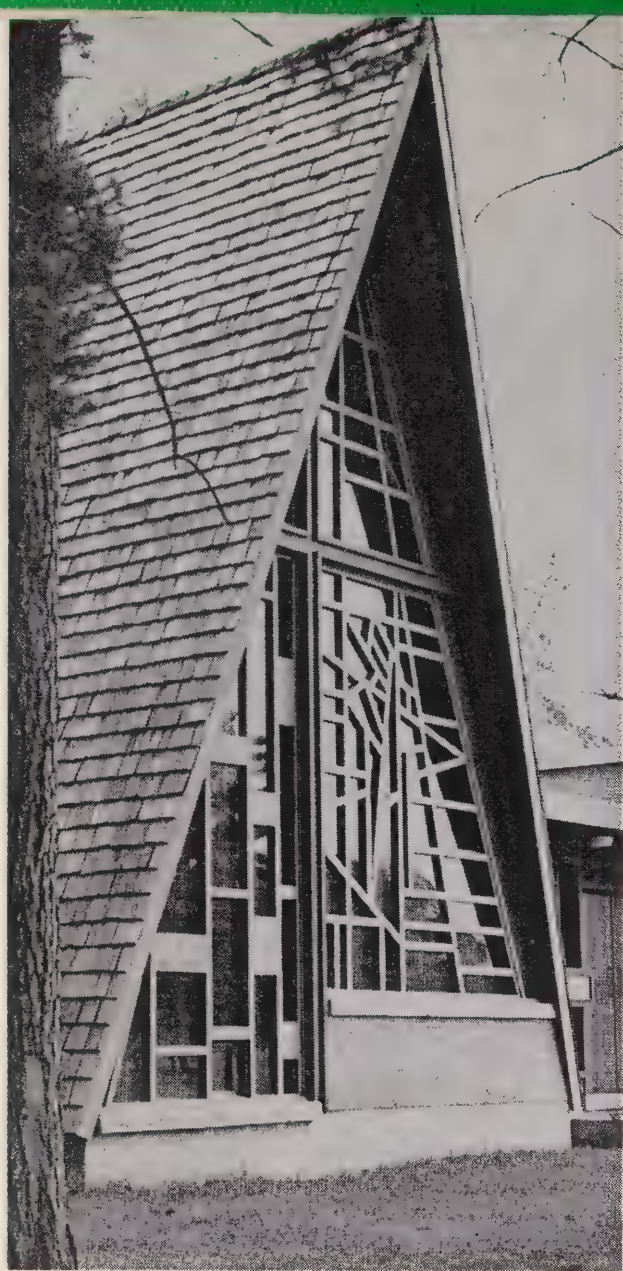
Unlike other towns the same size, there's no busy downtown core in Deep River. But there are three shopping centres with plenty of parking and no meters.

While he talks about the town, Mr. McConnachie likes to reminisce a little. He recalls shortly after coming to Deep River he attempted to cash a cheque — "a pretty small one at that" — at the Bank of Montreal, and it didn't have the money. "But when you look at the staff they have now. . . . Life wasn't all that easy, either. Winters were long and cold and the amenities were few."

All that's pretty well changed now and the Deep River townsfolk have just about everything they could want close at hand. One thing that hasn't changed, though, is that most people earn their living through the Canadian nuclear power program. The majority work at the Chalk River Nuclear Laboratories, but there are a number of Ontario Hydro employees attached to NPD (Canada's original experimental nuclear power station), the nearby Nuclear Training Centre, and the Des Joachims hydro-electric plant who make their homes here.

Overseas trainees and visitors are billeted in AECL's three staff hotels while Hydro employees and their families may rent Hydro-owned apartments in town. But residents may also buy their own homes, unlike the days when it was a company town.





convent and the Ontario Hydro apartments for employees working at the nuclear plant and training centre at nearby Rolphton.



It's this successful inter-marriage of AECL and Ontario Hydro personnel that Jac Cropley, staff welfare officer at the plant and former executive secretary of the Deep River Community Association, credits with making the town a "much more interesting place to live."

And the community association itself, with its 70 clubs ranging from organized swimming for the youngsters to golf and yachting for the adults, contributes in no small measure to making Deep River the ideal community.

But one of the proudest men is Deep River Hydro manager Bob Spence. His utility has twice come close to holding the provincial record for per capita kilowatt-hour consumption and before next year he expects to be number one. He doesn't even have

a close second to his record for the largest number of electric heating conversions — and from the way he sets his jaw when he talks about the electric heating market, it isn't likely that he will.

"There are 1,361 houses in Deep River and five are under construction. One hundred and eighteen of the houses are electrically heated and so are the five apartments in town. We've five schools here and there's electric heating in all of them.

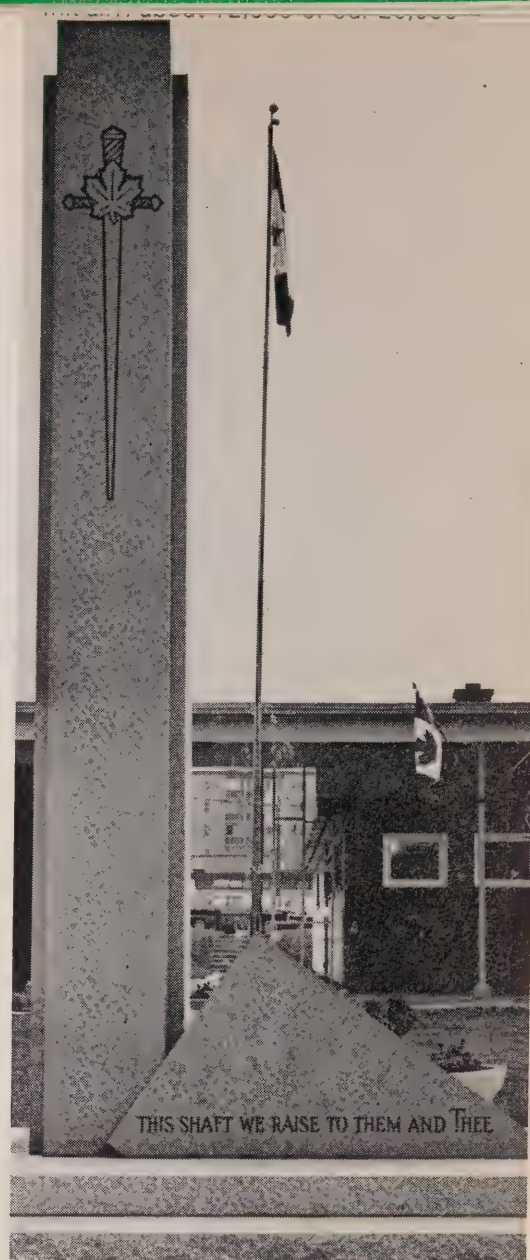
"The very minute Ontario Hydro announced it would enter the heating market, I jumped on the bandwagon — matter of fact, I presented a paper in Kingston calling for entry into the heating race before it was even announced — because I'm a firm believer in our product.

"Deep River's a nice clean town — we don't have any air pollution here and feel saturation selling of electric heat is one way to keep it like that," Mr. Spence says.

Of course, he says with a smile, the town is a natural for the conversion market, too. Many of the houses are of wartime vintage whose furnaces are due for replacement — and he's right there to convince the owners to switch to electricity.

When he looks toward the huge MacKenzie High School, he beams with pride. "There's 1,100 kilowatts of electric heat under that roof," he says. "That's as much load as there was in Deep River when I came to town in 1950. We used to have one transformer bank that fed the entire town — now we have one of each





e to feed the school – and it's still  
ly 70 per cent electric."

course, he gets a lot of commission  
cking in his fight for increased kilowatt-  
ur consumption, for two of the three  
mmissioners, A. J. Vale and R. K. Elliott,  
e electrical engineers. Mr. Elliott is also  
former district president of the Ontario  
unicipal Electric Association and a  
mber of the provincial association's  
wer Costing Committee.

b Spence is a man who loves his town  
d likes to take visitors around it. As he  
as, he makes it a point to show them the  
gnificent homes – all-electric, of  
urse – and the unequalled scenery. One  
his favorite spots is the local ski lodge  
ere the Laurentians form a beautiful  
kdrop for the Ottawa River.

George Howey, Ontario Hydro's Nuclear  
Training Centre superintendent, is one who  
isn't convinced that Deep River was as  
well planned as it might have been. He's  
lived away from town twice and on his  
return found the lack of orderly planning of  
a downtown area rather hard to take.

"I find shopping can be quite frustrating –  
especially when you hear that the  
merchant is out of what you want 50  
times a year. It forces you back to the  
catalogue. The town can't support a  
car dealership or furniture stores, for  
example."

Despite the frustrations, though, he still  
thinks Deep River is a great place to live  
and an excellent place to raise children,  
especially the younger ones. "They're  
entertained all day long, summer and

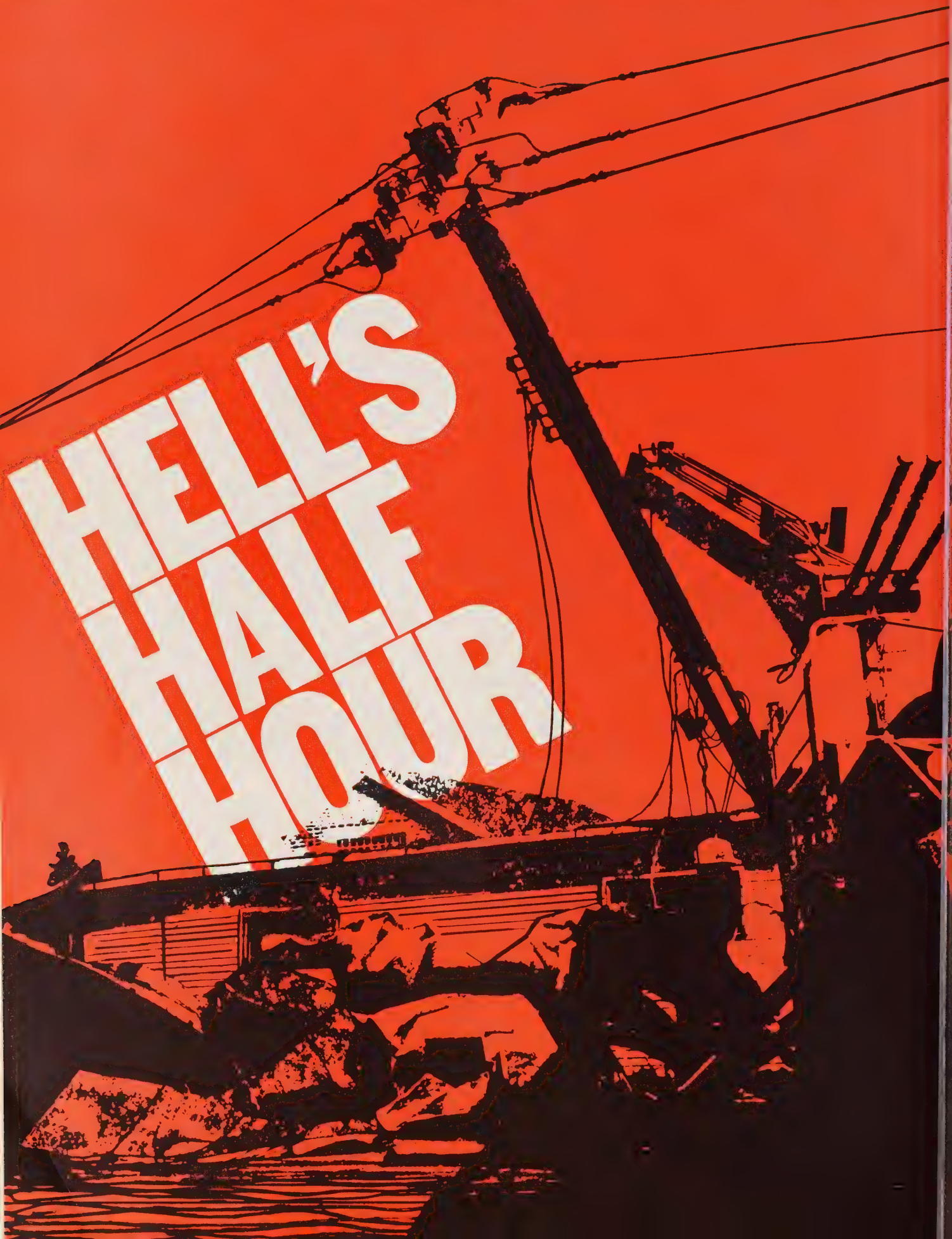
*Deep River's beaches provide relaxation after  
a day's work at AECL's Chalk River Nuclear  
Laboratories, below. No name is etched upon  
the war memorial – the town came into  
existence only at the close of the second  
world war.*

winter, which really compensates for the  
drawbacks," he says.

Deep River celebrated its silver jubilee  
during the first week of July – and  
thousands returned "home" to help. They  
came from across Canada, and from over-  
seas. At 25, the town still has the refresh-  
ing sparkle of youth. And all its optimism,  
too. □



# HELL'S HALF HOUR





sweeping through the Nickel Belt communities of Sudbury, Copper Cliff, Lively and Field to carve a swath of destruction. In its wake it left several dead, hundreds injured and millions of dollars of damage.

As the winds tore in from the west, uprooting trees, demolishing homes and hurling boxcars from their tracks, they blacked out about half the city of Sudbury and left thousands of Ontario Hydro

*Distribution lines snake in all directions and wood poles lean at crazy angles in the aftermath of the Sudbury storm.*

customers without power. Some of the worst devastation was in the town of Lively, where 60 homes were destroyed.

The gale also felled six towers on the extra high voltage transmission line feeding power from hydro-electric stations on the James Bay watershed and knocked out a portion of the east-west tie-line between Sudbury and Sault Ste. Marie.

Yet it was only a matter of hours before most people could switch on their lights again as emergency crews swung into action and help poured in from across the province.

customers were without power," said Sudbury Hydro manager Hugh MacKinnon. "By midnight, we were down to about 500, and these included homes so badly damaged they couldn't be connected up, anyway."

Mr. MacKinnon was in his office when the storm struck, about 8.30 a.m. "It turned very dark, dark as night. It was very eerie. And then came the wind and the rain. I'd no idea of the extent of the damage until I went out. I could hear the crews





was a complete shambles, but I didn't appreciate the full extent of the damage until I saw it for myself.

"Most of the damage to our lines was caused by objects flying from buildings — pieces of metal guttering and even entire roofs."

To help restore power in the city, the utilities in Orillia, Sault Ste. Marie, North Bay, Espanola and Capreol dispatched crews and equipment. Tree crews from the Ontario Department of Lands and

Sudbury Hydro's disposal.

"I called for help around noon and the first crew arrived about two o'clock," said Mr. MacKinnon. "One of their main difficulties was getting here in the first place, especially from the west where the highway was partially blocked with debris and traffic. It took the two crews sent from the Sault three hours to negotiate the last 25 miles, and that was with the help of the police."

Ontario Hydro brought in crews from as far away as Belleville, Ottawa and Toronto

power to the stricken area surrounding the city. Three helicopters arrived with hours to survey lines for damage and help in restringing operations.

Hydro Chairman George Gathercole flew to the area by helicopter the next day to inspect the damage and speak with the linemen.

"I was impressed and proud," he said. "Our men were working under adverse conditions to say the least. But by the time I arrived, service had been restored to more than 9,000 rural customers and





together, Ontario Hydro had about 200 staff on the job. Sudbury Hydro had about 60 men doing repairs, patrolling the streets and conducting an inventory of the damage. They were assisted by 23 men from neighboring utilities.

The storm came in on a curving track through the less densely-populated southern end of the city," said Mr. MacKinnon, "otherwise the damage in the city might have been much worse.

of people at times like this. Somehow, we missed a small street of about 30 homes in the initial survey and restored power all around them. We discovered them more or less by accident the evening after the storm, still in the dark.

"They were all just sitting there waiting patiently for power to be restored. And no one had bothered to inquire or complain."

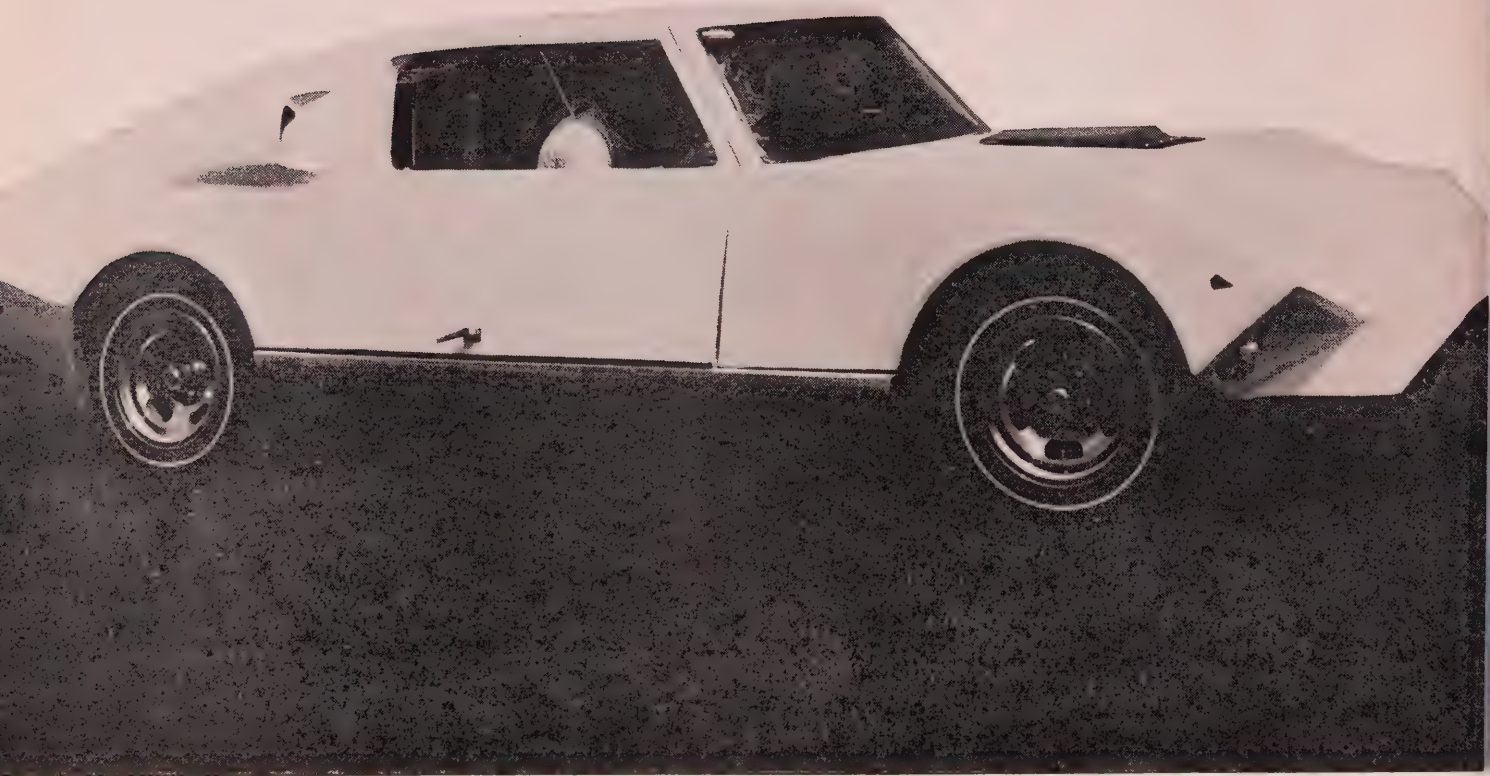
*with almost unbelievable fury, shearing Hydro poles and ripping down wires. Emergency crews quickly went into action and Ontario Hydro helicopters were pulled off other jobs to assist.*





# THE GREAT RACE

## CAMBRIDGE TO PASADENA



Time meant very little and speed even less in the great race.

What was important in the cross-country dash from Cambridge, Massachusetts, through Ontario to Pasadena, California, was the amount of pollutants discharged into the atmosphere.

The 42 vehicles entered in the clean air car race sponsored by the Massachusetts Institute of Technology and the California Institute of Technology were intended to prove that automobiles need not cause air pollution.

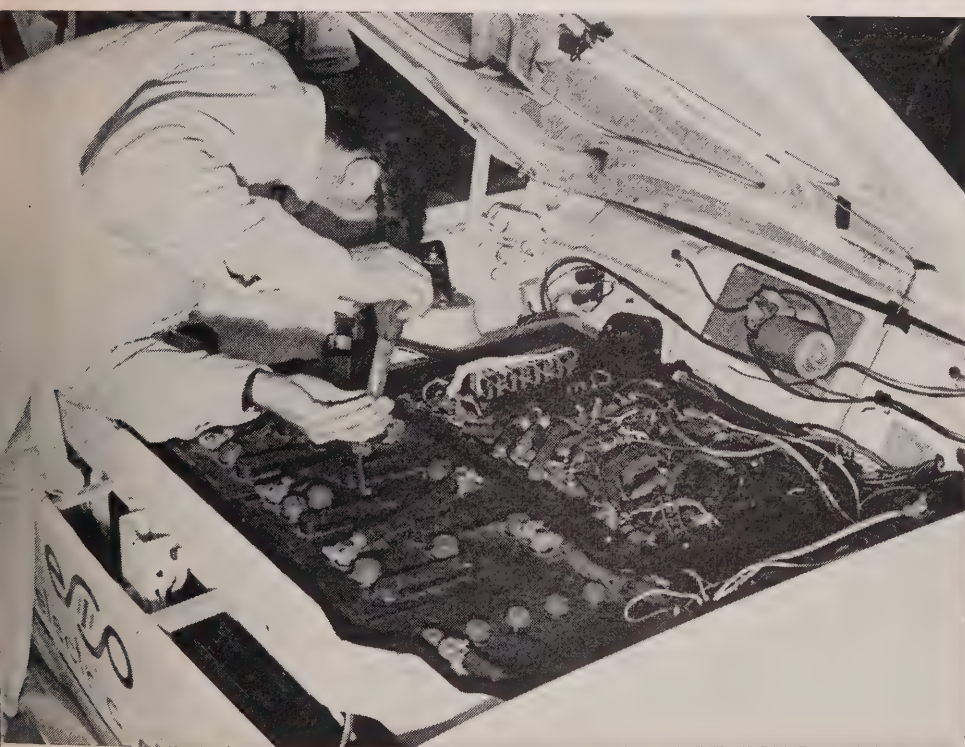
There were electric cars, propane-electric hybrids, steamers, turbines, diesels and liquefied natural gas burners in the line-up. And there was even an electric motorcycle entered by a group of students from Campolindo High School in Moraga, California.

Most vehicles were standard cars with conventional internal-combustion engines modified to burn a variety of fuels. But some, like the University of Toronto's entry Miss Purity, were built from the ground up by students.

Entertainer Arthur Godfrey was also represented in the race. His electric car, built by students at Cornell University, rolled into Toronto's Varsity Stadium on the second day of the race. In the final standings, it topped the all-electric category.

For a week before setting out on the 3,600-mile trek, cars had to undergo exhaustive testing at the MIT campus. Officials checked out everything from performance and manoeuvrability to exhaust emissions. Miss Purity, an electric





propane hybrid, eventually tied for first place in her class and her crew received \$5,000 in prize money.

The only other Canadian entry was a modified internal-combustion engine that runs on propane. It was built by students at St. Clair College in Windsor.

Ontario Hydro and four municipal utilities participated in the Ontario leg of the race by installing "filling stations" for the electrics. The 100-kilowatt charging

stations were set up at the Burlington Mall, Varsity Stadium, on Highway 401 near the Guelph cut-off, and at London, Chatham and Windsor.

Rules required that all cars be driven and maintained by students along the entire route. Race observers were at all times ticking off the good points – and the bad – every inch of the way. Vehicles carrying everything from spare parts, tools,

*An electric-propane hybrid, Miss Purity, built by student engineers at the University of Toronto, tied for first place in her class. Her crew, captained by Doug Venn, middle of photo above, received \$5,000 in prize money. Ontario Hydro and four municipal utilities provided "filling stations" for the electrics.*



California high school students, was entered in the race. Entertainer Arthur Godfrey's electric car, below, built by a group from Cornell University, topped its class.



batteries and light refreshments followed the participants.

Quick repair jobs were done along the side of the road. More than one flat tire had to be changed by the student engineers, who had more interest in the sophisticated electronic gadgetry than in ordinary wheel-changing.

In Ontario, most of the attention was centred on registration plate UT 1 . . . Miss Purity. Five students worked on her full time at the university from April and about 20 helped on a part-time basis.

Douglas Venn, 23-year-old heat engineering graduate, explained the vehicle is capable of running on three different propulsion systems: all-propane; a propane engine running at constant speed, charging 10 storage batteries that run an electric motor; or electric only.

On the Boston-to-Toronto leg, he said, the car made the 540-mile trip on propane only except for one mile when he ran electrically. "But because I goofed, we blew a fuse in the electrical system — but nothing serious and we were able to

replace it in a couple of minutes at Varsity."

Mr. Venn echoed the sentiments of the Cornell team driving Godfrey's electric car — that more intensive research into batteries is needed to perfect the pure electric car. "There's nothing at all wrong with electric cars — we've even got dash-mount mini-computers — but longer-charging batteries capable of going longer distances are what's needed."





*Strictest attention was paid to the rules of the road and no exception was made for entrants passing through the Burlington Skyway toll booths. Miss Purity is seen, left, with her hood open for inspection.*

...electrics have a range of 80 to 100  
...es before recharging but, says 20-year-  
...Jane Hersey, a member of the Cornell  
...n driving Godfrey's car, "despite this  
...or drawback they're still the cleanest.  
...l this one handles like a dream." □



# the North speaks out

**Commissioners from electrical utilities across Northern Ontario aired their views at fall meetings of the Ontario Municipal Electric Association.**

## **district 3**

### **future of assets protected**

A ruling by Municipal Affairs Minister Darcy McKeough that Thunder Bay Hydro should be compensated for former Fort William Hydro real estate taken over by the new municipal council establishes an important precedent for utilities caught up in regionalization or amalgamation, delegates at Schreiber were told.

Thunder Bay Hydro chairman Jim Currie said the ruling establishes that the future of utility assets will be protected in the event of regional government or, as in the case of Thunder Bay, an amalgamation.

"What the minister's saying," Mr. Currie added, "is that regardless of who holds title to a utility's property, that which was paid for out of an electrical utility's funds must be compensated for in the event it's declared surplus and sold by the municipality."

Mr. Currie charged that legislation creating the new city of Thunder Bay was not specific enough when dealing with the division of assets that would properly accrue to the Thunder Bay Hydro Commission.

Despite attempts by commissioners to clarify the language under the first draft of Bill 118, the "ambiguity of the wording of clauses dealing with assets of Hydro in its final draft was a reflection of the same ambiguity of the Public Utilities Commission Act where it deals with the question of ownership," Mr. Currie said.

He said the mayor and council adopted the view that Thunder Bay Hydro was only a statutory agent of the corporation and as such could not own or sell property.

Hydro, on the other hand, was able to refute council's claim and produce documented evidence of ownership in the form of deeds registered by the Master of the Rolls in the name of the commission.

Because of the stalemate, Mr. Currie said, Mr. McKeough was called in to arbitrate. As a result of meetings with council and the commission, the Minister of Municipal Affairs ruled that the former May and Vickers street properties of the old Fort William Hydro would become the property of the city at a cost of \$447,000 to be paid over a five-year period. □



*Atikokan Hydro Commission turned out in force at the District 3 OMEA convention at Schreiber. From left are manager M. H. Kelly, chairman W. H. Calder and commissioners D. A. Baird and S. G. Hancock.*

### **Hydro 'does pay for northern water'**

As a result of some misunderstanding, particularly in Ontario's northland, it was suggested that Ontario Hydro does not pay water rentals in the north, Ontario Hydro commissioner Dr. J. D. Fleming said at Schreiber.

In an address prepared for delivery by Hydro chairman George Gathercole, who was unable to attend the meeting, Dr. Fleming said the commission does not pay water rentals on 32 of the 35 hydro-stations in the north.

Payments, he said, are based on the annual horsepower generated by a station and are geared to the Consumer Price Index.

"During 1969, Ontario Hydro paid out \$10 million in water rentals, of which \$9.1 million was paid to the provincial government while most of the balance went either to the federal government for stations located on canals or to the Province of Quebec for use of Ottawa River water," Dr. Fleming said.





*Among the OMEA District 3 executive are (back row) James Currie, first vice-president, Thunder Bay; W. H. Calder, second vice-president, Atikokan; Allan Kelly, Nipigon; E. A. Vigers, retiring secretary-treasurer, Thunder Bay; E. J. Hawthorne, Dryden. Seated are president A. J. Marshall, Fort Frances, and E. G. Caccamo, past president, Schreiber.*

He added that the amount of capacity involved in the three small northern plants in which Ontario Hydro doesn't pay water rentals is only about 27,700 kilowatts and "these are special cases where water rights were acquired by Ontario Hydro some years ago from the original owner."

The three plants are Kakabeka Falls on the Kaministiquia River and the Nipissing and Elliott Chute plants on the South River. However, Hydro does pay water rentals on the 45,000-kilowatt Silver Falls generating station upstream from Kakabeka, Dr. Fleming pointed out.

"We believe that beauty and power production can co-exist as they do at many of our stations. In 1962, Ontario Hydro entered into an agreement with the provincial government guaranteeing much higher minimum flows over Kakabeka Falls during the tourist season. If river flow is not sufficient to maintain full power production while meeting the terms of the agreement, generation is reduced accordingly. We're doing our best to preserve Kakabeka Falls as one of the major tourist attractions of the Northwest," Dr. Fleming said.

Dr. Fleming echoed the sentiments of Thunder Bay Hydro chairman Jim Currie that "an important precedent has been established in the disposition of two pieces of real estate by the newly-formed utility.

"The principle involved, that municipal electric revenues or funds should not be used for other than power utility purposes, has been the cornerstone of the provincial power system," Dr. Fleming said. □

## Indian reserves to get power

Electrical service will soon be extended to several remote Indian reservations, K. N. Bodkin, Ontario Hydro's Northwestern Region manager, told delegates at Schreiber.

Mr. Bodkin said it's expected that electrical service will be available to the Osnaburgh Indian Reserve late this year from a line extending from the distribution station at Pickle Lake Landing while the Department of Indian Affairs is installing diesel generators at the Fort Hope Reserve, about 125 miles north of Geraldton.

Mr. Bodkin said Hydro is helping to design the Fort Hope system.

The decision to carry electrical service to remote Indian communities was the culmination of a series of meetings called to develop a realistic approach to the supply of power to Northern Ontario settlements, he added.

One of the highlights of the year was the closing of the final link in the 230,000-volt east-west tieline, enabling a complete interchange of power between Hydro's two transmission systems.

In addition, the completion of a North-western Ontario-Manitoba-Saskatchewan tie hooked the three into a vast power grid that will help provide greater security for the Northwestern Ontario system.

Looking at the Northwest's economic picture, Mr. Bodkin suggested the region is in a boom period. Demands for electric energy, he said, have long been considered a reliable economic barometer and in 1969 a record peak demand of 650,000 kilowatts was reached.

The last decade ended on a high note for electric heating sales in the Northwest. In 1969, electric heating was installed in 334 homes in the region, the greatest number since the electric heating program was inaugurated 10 years ago. □



# the North speaks out

*District 9 directors J. Darby, Espanola; V. E. Gardi, Sault Ste. Marie and R. S. MacKay, Thessalon, are seen in discussion after their re-election.*



## district 9

### zero growth attacked

Outlining the pressures on the electric power industry today, Ontario Hydro's director of sales D. A. Ramsay attacked the "zero growth" concept — the view that growth of any kind, including power production, increases pollution and must be eliminated.

"It's my personal view that pollution has always been with us," Mr. Ramsay said. "By merely increasing the population we have brought on pollution. Unfortunately, Ontario Hydro has been singled out by the environmentalists, probably because of its size and because everyone likes to take on the big fellow."

Proponents of "zero growth" suggested that the power industry may be confusing needs with wants. "Unfortunately, many of the prime movers of this school of thought are people who are fomenting revolution against the style of life to which we are accustomed. They are particularly hostile to business and industry."

Mr. Ramsay said that a large and influential group of conservationists and editorial writers were calling for a return to Thoreau's Pool (Thoreau was the 19th century American writer who attempted to return to nature living beside a small pond).

"If they succeed, Thoreau's Pool had better be full of fish," he added, and asked, "Does the customer really understand that our whole purpose of being in business at all is to serve him?"

H. K. Wright, Ontario Hydro's manager of commercial and industrial sales, told delegates that his department's major industrial objective was to stimulate the use of electrified process heating equipment.

He listed several advantages to the industrialist of switching to electricity including lower initial costs, the flexibility of electrical heating devices, greater efficiency, improved control and absence of pollution.

Delegates passed an amended resolution calling upon Ontario Hydro's inspection department to enforce regulations for the identification of electrical circuits at the distribution panel and to investigate the possibility of coding each electrical outlet.

The resolution was introduced by John Darby, of Espanola, who said it was usually a question of trial and error for the householder to locate the right fuse. Identification of each circuit at the fusebox would allow people to find a blown fuse immediately.

Martin Pask, regional consumer service engineer, said all circuits should be identified, but it was possible Hydro's inspectors were a little lax in enforcing the regulations. "Unfortunately, they are pressed for time and the safety aspects of their job must come first," he said. □

### plan well ahead, utilities told

Because of the difficulty in acquiring property and satisfying environmental considerations, the heads of northern

municipal electrical utilities were warned to plan their projects well ahead.

Ontario Hydro regional manager T. E. Flinn told delegates about the problem involved in building transformer static distribution stations, and transmission to meet increased power demands around North Bay.

"It is noteworthy that this project was subjected to delays which are typical of times, but which some of us may not have thought applicable in the North," said Mr. Flinn.

"Ontario Hydro was accused of visual pollution and of wantonly defiling the landscape with its right of way. Acquiring property for the stations and lines was difficult.

"The lesson to be learned by all utilities is that they would be well advised in future to allow plenty of lead time for their projects. They should also take a good long look at the aesthetics in their engineering."

Mr. Flinn added that prolonged industrial strikes in Sudbury reduced the region's peak load by 215,000 kilowatts last year. Despite this, the region's peak load rose 10 per cent over the 1968 record and compares favorably with a 5.9 per cent increase over the entire province.

Expansion by the nickel companies is bringing a rapidly increasing residential and commercial market for the sale of electricity in Sudbury, Mr. Flinn said. Chaparral and Hearst are increasing their electrical load about 10 per cent a year. Chaparral's load has risen 200 per cent in eight years.





*Award for 15 years' service is presented to secretary-treasurer Ron Duncan, of Coniston, by OMEA president D. G. Hugill. Below, Mr. Duncan discusses program with B. H. MacPhail, third vice-president, Capreol; W. E. Edwards, president, Sudbury, and R. Marleau, second vice-president, Sturgeon Falls.*



## Utilities 'must train their own people'

Because of the unique skills required by the electrical utilities, the industry has no alternative but to train its own people, said Hugh MacKinnon, chairman of the AMEU's manpower planning committee.

As industry becomes more technically oriented, there is a rising requirement for technical manpower in an ever-widening range of occupations," he said. "With the increasing complexity of new systems and techniques, many skills are becoming obsolete, other skills need upgrading and new skills are being required.

It would almost appear that the rate and degree to which industry can continue to improve its systems and techniques will eventually depend on the educational facilities of our communities and the training facilities that are made available or provided by industry.

Although this training requirement applies to industry in general, it applies to our industry to a great extent considering that many of the skills of our industry are unique in the sense that they are not common to those normally found in communities."

MacKinnon, who outlined what the AMEU was doing in the way of lineman, supervisory, office staff and marketing training, said revolutionary changes are taking place in the work environment.

Man has liberated himself from the behaviors and inhibitions of the past and

is rapidly developing — to say the least — a well-articulated scorn for the conventional status of things. He is no longer driven by economic determination. He is no longer preoccupied with working and earning. He is protesting against what an industrial psychologist called the dehumanizing treatment of organization as he strives for recognition and the feeling that he matters in the scheme of things.

"He is looking for a form of personal fulfillment in a vocation that does not turn him off — where he can do his thing and find a real sense of achievement," Mr. MacKinnon said.

"The result is that the science of administration is gradually giving way in prominence to the art of motivation, which in turn suggests that the future of the supervision or management employee will probably need to include continuing training and, perhaps, conscientious personal development if he is to remain effective in a changing community with changing people." □

## voice of OMEA must be heard

The voice of the OMEA must be heard if the present system of elected hydro commissions is to be maintained, association president D. G. Hugill warned District 9 delegates.

"We are in a very good position in that we can watch the results in Niagara and other areas where regional government is

being introduced and gain from their experience," he said. "But we must make no bones about it — District 9 stands one hundred per cent behind the OMEA and the maintenance of elected commissions to manage the power system under any form of municipal government.

"From Cochrane to North Bay to the Sault, let us speak with one voice on this important matter," Mr. Hugill said.

"Remember, regional government is the committed policy of the provincial government. Therefore, while we did not create this situation we must live with it. If we want to influence the conditions under which we live, we had better make sure that our voice — the OMEA — is heard and heeded."

Earlier, district president W. E. Edwards, of Sudbury, said some of the statements by Municipal Affairs Minister Darcy McKeough and his advisers were not too flattering toward Hydro commissions.

"I personally feel that some of us will be surprised by the government's recommendations and I suggest that we all do a little homework before it's too late." □

**Reports on the District 2 OMEA meeting at the Elgin House will appear in the November issue of Hydro News.**



# along hydro lines



## Keep seven commissions

The OMEA has called for retention of seven elected Hydro commissions in the new regional municipality of Niagara in a brief to Municipal Affairs Minister Darcy McKeough dealing with the distribution of power in the region.

They are Grimsby, Niagara Falls, Niagara-on-the-Lake, Port Colborne, St. Catharines, Thorold and Welland. Utilities in Beamsville, Pelham, Wainfleet and West Lincoln will be eliminated.

But while recommending absorption of the four utilities into Ontario Hydro's rural system, the OMEA says that the municipalities should have the continuing right to establish electric commissions.

The association further recommends that negotiations begin immediately between Ontario Hydro and the Canadian Niagara Power Company for the surrender of retail franchise rights by Canadian Niagara to the town of Fort Erie so that all retail customers in the municipality can be served by a new commission, or the enlargement of the company's franchise to serve all retail customers in the former township of Bertie.

"Technical and economic studies our committee has commissioned," the brief states, "have indicated that one top-tier commission serving the whole regional municipality would be economically viable with some upward rate adjustments."

One top-tier commission would not present serious technical or geographic service problems "and may, indeed, in time prove to be the ultimate answer," it adds.

"However, we are not recommending it because it is politically unacceptable at the present time in this region and there is excellent evidence for this statement. The obvious, but far from insurmountable, difficulties providing for the election of a representative and democratic top-tier commission of optimum size will impel consideration of the expedient but undemocratic and, to us, thoroughly undesirable alternative of an appointed commission."

Chief among the guiding principles governing the OMEA's recommendations, the brief says, was that municipally-owned electric utilities should be managed by elected commissions. The area of utility service should correspond to the municipal boundaries and within these boundaries there should be one — and only one — supply authority at the retail level. □

## Rural rates raised

Ontario Hydro has announced an across-the-board increase in rates to its 600,000 rural customers. Effective on bills payable January 1, the rate change will increase revenue from Hydro's rural customers by 9 per cent.

Specific percentage rate increases to customers vary according to service classifications. Details are being mailed directly to all customers.

In announcing the increase, Hydro Chairman George Gathercole said it was "regrettable, but unavoidable. Owing to inflation pressures and rising costs, Hydro's rural system is now operating at a substantial loss."

He added that costs have been escalating for equipment supplies, salaries and wages, and interest on capital funds. Methods to control air pollution have become an increasingly significant budget consideration with heavy expenses incurred for the installation of pollution abatement equipment and purchases of low-sulphur fuel.

"The adjustment of rural rates," Mr. Gathercole said, "has been deferred until absolutely necessary. It is designed to offset current operating losses and meet predictable cost advances. The increase will barely meet costs, but should carry us into 1972."

"If Ontario Hydro is to maintain its ability to meet the power needs of the province, an increase in revenue from all customers is unavoidable."

## Worthy tribute



*Now it's official*

Welland Hydro's new service centre will stand as a permanent tribute to the utility's commissioners who have worked zealously on behalf of their fellow citizens, Ontario Hydro Chairman George Gathercole said as he cut the ribbon (above) to open the new building late last month.

"And it's a worthy tribute," he added as he pointed out that Welland has a reputation as an energetic municipality with a record of getting things done.

Welland, Mr. Gathercole said, was one of the first municipalities in North America to have electric street lighting and acquire its own power distribution system in August, 1912. He said there were 479 lighting and power customers in 1913 when the members of the Welland Hydro-Electric Commission took office.

"So confident were they of the future of Welland and the need to look for electric power, that I understand they went so far, years later, as to authorize the purchase of a bicycle for the secretary for his own use."

"Their confidence was certainly justified. From 12 employees in 1913, Welland Hydro now employs 49. The peak load in 1913 was 300 kilowatts and assets totalled \$73,993. Last year's peak load was more than 41,000 kilowatts and today assets are valued at more than \$6 million. And during that time new industries have located in the area, the population has multiplied, schools, churches and other developments have sprung up."



think one can justifiably claim that Volland Hydro has played a major part in the expansion and development of this city," Mr. Gathercole said. □

## More Canadian coal

Canadian coal production may reach 60 million tons a year by the end of the decade, say officials of the Department of Energy, Mines and Resources.

Deputy Minister John Wilson, in a speech prepared for the 2nd annual Canadian Conference on Coal in Vancouver, said the world is facing an international coal shortage and producers can reasonably expect Canadian coal production to climb from 10.6 million tons mined here last year to 40 million tons by the mid-1970s and to 60 million tons by 1980.

But he warned producers against any complacency, suggesting that Canadians are facing stiff competition from other coal-producing nations.

"Currently, we have established a strong foundation in the valuable metallurgical market of Japan and electrical utilities in the Prairies. But business prudence indicates that Canadian producers must add to and diversify from this essential base," Mr. Wilson cautioned.

A preliminary assessment of coal resources in Western Canada indicates there is as much as 118 billion tons, including bituminous coal in British Columbia, sub-bituminous coal in Alberta, and lignite in Saskatchewan.

However, Mr. Wilson said, only a portion of this can be hauled to the surface and loaded into railway cars unless other economical methods of extraction are devised. □

## Coal-to-gas conversion

The US has embarked on a major research program to convert coal to synthetic pipeline gas and liquid fuel to help ease its growing energy crisis, says George Fumich, director of coal research for the Department of the Interior.

"The developing energy supply shortage in the US is of major magnitude," Mr. Fumich told delegates attending the Canadian Conference on Coal.

He added that the development of synthetic pipeline gas from coal is much nearer than liquid fuel, which has been pushed back by oil discoveries on the north slope of Alaska. However, liquid fuel from coal will be needed eventually as a hedge against higher oil import prices and to cover the possibility of the curtailment of foreign imports for any reason.

Mr. Fumich said the long-term future for coal in the US is challenging and bright, but the short-term picture is clouded by shortage problems that are expected to continue for several years."

He attributed the energy crisis to unexpected difficulties in starting nuclear power plants into service in the US and the growing clash between the energy industry and conservationists. □

## Loved his city

The recent death of Stan Lewis meant the passing of an era in the civic administration of the nation's capital.

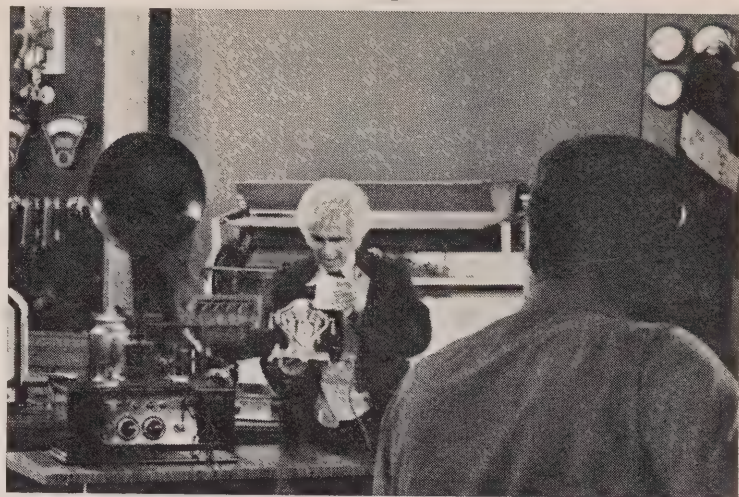
For in his 82 years Mr. Lewis was mayor of Ottawa for 13 years, Ottawa Hydro chairman for 19 years and a commissioner for 31 — three of them records.

MP Lloyd Francis said in tribute to Mr. Lewis, who stepped down from the Hydro chairmanship earlier this year, that he epitomized a period in Ottawa's development. He made it his business to know what was going on in the city . . . and he literally knew exactly what was happening. He loved this city."

And Hydro chairman L. L. Coulter called Mr. Lewis "one of the

great gentlemen of this city . . . a friend of everyone, rich or poor, and a man who always wore a smile. I don't think they come any better. He was always there to help." □

## 'Here we have this great . . .'



*Poking fun*

Comedian Johnny Wayne, in his role as the Mad Professor, prepares for a scene amid the Ontario Hydro historical collection at Hydro's service centre in Etobicoke. The scene is part of a science series being produced by the CBC for educational television. Other segments were shot at Hydro's Research Division high voltage laboratory and at the Hydro exhibit at the Ontario Science Centre. □

## End of the line

For 81-year-old railway pensioner Jack Phillips, the end of the line in a career that has spanned 39 years as a Schreiber Hydro commissioner came at the OMEA District 3 conference in his hometown.

Earlier this year, Mr. Phillips announced that he would step down "to let the younger men in town have a chance at running the affairs of Hydro."

And just about everyone in Schreiber turned out at a town hall banquet to wish him well in his second retirement. It was an emotion-charged affair as presentations were made to Mr. Phillips and to Ed Vigars, who has announced his retirement as Thunder Bay Hydro's manager and as secretary-treasurer of District 3.

More than a single tear stole across Mr. Phillips' cheek as he accepted a living room electric clock from District 3 president and fellow commissioner Gino Caccamo to the strains of "For He's a Jolly Good Fellow" by a chorus of 100 voices.

Earlier that day he'd accepted a Province of Ontario plaque commemorating 25 years in public service from Reeve Fred Harness. He still carried it proudly with him at the banquet.

When the singing stopped and the standing ovation died down, Mr. Phillips said that in all his life he's never enjoyed anything as much as his Hydro work. "If I was a young man, I'd start all over again," he said. And he promised to attend the annual convention in Toronto next year, "just to keep in touch."

The inscribed silver tray presented to Mr. Vigars was for "eleven consecutive years of dedicated service as secretary-treasurer of OMEA District 3." He was also given a cheque by AMEU president John Murphy on behalf of the association. □

## Information please

Among the highlights of the Association of Municipal Electrical Utilities metermen's workshop at Toronto's Skyline Hotel on



November 6 and 7 will be an information-provide session geared to tell delegates about the latest trends and ideas in metering.

A group of panelists representing utilities, the Department of Consumer and Corporate Affairs and the Electrical Utilities Safety Association will make brief presentations then leave discussion open to the delegates.

Capacitors, a subject never dealt with at previous workshops, will be discussed at this year's get-together. A field trip to the Canadian Standards Association's Rexdale laboratories is also planned. □

## Nostalgic moment



*Under one roof*

It poured rain most of the morning and a haze hung over North Bay until mid-afternoon. But the dreariness of the day failed to dampen the spirits of North Bay Hydro commissioners, or their staff. For it was the official opening of their \$500,000 all-electric headquarters building and service centre.

It was a nostalgic time for W. Bruce McCubbin, North Bay Hydro chairman. His father was the commission's first chairman on its formation 30 years ago. And the occasion marked the first time that all the utility's staff and equipment has been under one roof.

The new building, which was opened by Ontario Hydro Chairman George Gathercole (seen with Mr. McCubbin), is situated on beautifully terraced grounds overlooking a park donated to the city by Lord Thomson of Fleet. With its striking design, it stands as a focal point in the city and presents a pleasing aspect from any angle. □

## Valuable cargo

When the SS Topdalsfjord sailed into Toronto harbor a short while ago she carried a cargo invaluable to Ontario Hydro — and to Canada's nuclear power program.

The Topdalsfjord brought 752 drums filled with 187 tons of heavy water. The Swedish heavy water was transferred to Ontario Hydro's Pickering nuclear power station to be used for the start-up of the first unit early next year. Each of Pickering's four units will require about 550 tons of the liquid.

Tupper heavy water plant in Nova Scotia has gone into commercial production. The Point Tupper plant will have a capacity 400 tons of heavy water a year. Atomic Energy of Canada Limited has an 800-ton-a-year plant under construction at Douglas Point on Lake Huron, and Deuterium of Canada Limited has a 400-ton-a-year processing plant under construction at Glace Bay, N.S.

## municipal briefs

Glowing tribute was paid to Islay Lambert, who recently retired as secretary-treasurer of Cannington Hydro after 28 years' service. Miss Lambert was also an employee of Ontario Hydro's Cannington area until her retirement in 1961. At a Cannington Hydro sponsored dinner she was presented with a wallet containing \$100.00. Close to 50 friends and associates gathered in her honor.

**Delhi PUC** is ready for industrial expansion. A new 3,000-kVA sub-station has been installed in the town's industrial park, increasing the utility's industrial power capacity by 60 per cent. Installation of the \$45,000 transformer was deemed necessary when existing equipment became overloaded last winter.

**Victor Gardi** has been elected to Sault Ste. Marie PUC. He succeeds Russell Eddy, who died earlier this year at the age of 65. Mr. Eddy was a commissioner for 12 years and served both as chairman of the utility and as a district director of the OMEA. He was on the job evaluation committee of Local 2251 of the United Steel Workers of America and was a keen member of the United Church. Mr. Eddy leaves a wife, Irene, and five children.

**Pigeon pollution** has been a bit of a problem in Seaforth of late. But the townsfolk didn't have too much trouble finding a solution. They called in the PUC, who dispatched an aerial bucket truck to the Royal block on the town's main street. Line crews were to chip away the particulate matter in an afternoon.

**OMEA president** D. G. Hugill handed out a bouquet at District 9 meeting of the OMEA in North Bay last month. "This is the only one of nine districts where an OMEA member has taken what I consider to be an OMEA responsibility — the office of district secretary," he said. "Let me hasten to say that the other eight districts are being well and faithfully served by members of the district AMEU, but my personal opinion is that the district secretary should come from the ranks of the OMEA." The secretary in question, Ron Duncan of Coniston Hydro, received the award at the meeting for 15 years' OMEA service.

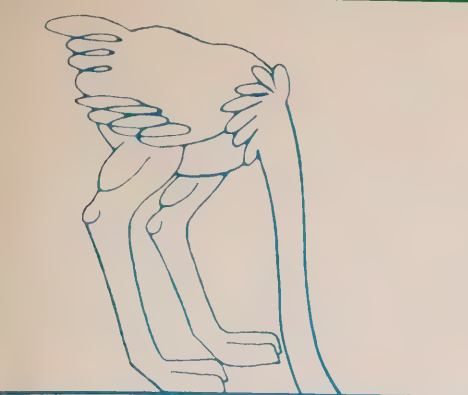
**Automation's** coming to Stratford PUC. The utility has decided to switch to computer billing sometime during 1971, and has authorized a \$23,000 expenditure for the equipment that will be used for its billing, accounting and payroll operations.

**Stratford PUC's** bus department has been awarded a Canadian Transit Association certificate of merit. The award is given to public transit authorities recording no lost time due to accidents during a year's operation.

**St. Thomas PUC** has promoted two of its employees. George Anderson has been named superintendent and M. J. Palmer has been appointed service and operations department foreman.

**Thunder Bay Hydro** honored its retiring manager E. A. Vigars at a dinner attended by 110 staff members and employees of the former Port Arthur PUC. Mr. Vigars was presented with a set of woodworking tools and a gold watch. He and his wife are retiring to a new home in Kelowna, BC.





## as don wright sees it

Anyone who pays attention to the datelines on news service reports can scarcely avoid the impression that the only constant and reliable source of humor to be found in the news these days is Britain. As an avid collector of oddball news tidbits, we are convinced that at least 50 per cent of the world's supply emanates from the land of tea and crumpets.

Nothing funny is to be found in the stilted announcements stamped for release by iron curtain countries. Italy and France contribute only the odd gem and, by the law of averages, the lurid flow of terrible tidings from south of the border is laced occasionally with comic relief. Only Britain stands out as a rock of peculiarity in a torpid sea of mundanity.

Students of humor suspect that the British take perverse pleasure in their own eccentricities and whether or not these weird and wonderful newspaper accounts are delivered tongue in cheek has puzzled us for a long time. As an example we might cite a recent nugget tucked away in the no-nonsense British Medical Journal. In discussing the relationship between occupation and joint disorders, the Journal refers to bass-players' thumb, painters' elbow, porters' neck and wicket-keepers' fingers. It goes on to say: "There is also a condition called yoga wrist, which occurs in gentlemen who strain their wrists supporting their heads while standing thereon in their daily yoga exercises."

Consider also these three classics from a collection by the New Statesman published in paperback form:

London Transport staff at Acton today found footprints on the freshly painted ceiling of an underground carriage. They were investigating if a human could have walked upside-down on the ceiling while strap-hanging.

— Star

Mr. Ernest Brown crystallized the unemployment problem when he told Parliament that it was really a question of finding jobs.

— Oxford Mail

A seven-inch edible snail was caught at London port yesterday after it had hidden on a Comet in Nairobi. The snail was taken to the RSPCA vet.

— Daily Mail

The latter item is particularly significant insofar as it suggests how English asininity seems to reach its peak in matters relating to all manner of creatures outside the species homo sapiens.

Indicative of this preoccupation with things other than people was the recent outcry against the use of electrical prods by rent collectors to ward off ravening dogs. These devices effectively discourage Fido from between-meal snacks of rump roast and other tender on-the-hoof morsels while inflicting neither harm nor pain on the dog. Nonetheless, a large and vocal number of Britons consider the prods inhumane and prefer to allow the dogs to feed at will on the collectors.

Perhaps the most devastating example of English absurdity was quoted in a column by Alexander Ross in the Financial Post. It originated in a letter to a British newspaper:

"It is because of unnecessary cruelty to worms that I would also suggest the prohibition of all games on grass. I once saw a beautiful worm unnecessarily killed by a rugby player's boot, and no doubt death by violence must be caused to millions of these useful creatures in the pursuit of balls."

■ What else do we hear from England of a more serious bent? Well, there is a rather alarming report by a Surrey doctor to the effect that Englishmen may be in danger of pedaling themselves to extinction. According to the doctor, as reported by Canadian Press, men who bicycle to work may be ruining their chances of becoming fathers as sitting on a bicycle seat can disturb a man's fertilizing cells. The report ends on an encouraging note with the suggestion that there will always be an England so long as its inhabitants are not too long in the saddle.

"A man cycling to a party hoping that it will act as a contraceptive can forget it," the doctor warns. "It takes at least six weeks' hard cycling before any effects are apparent."

No doubt the warning was well intended, but we suspect that the number of men cycling to parties with this purpose in mind would be minimal. He does seem to imply that English parties are far from dull.

■ Elsewhere on the British medical front they are predicting big things for bat spit. It has been discovered that the saliva from bats contains an enzyme which helps dissolve blood clots and, if this can be purified, the boys feel it would be useful in the treatment of thrombosis in human patients.

A colony of vampire bats is doing the spitting and it takes 10 minutes for them to cough up about one-twentieth of an ounce. And if you think that sounds a bit batty, what about the intensive effort now being mounted to domesticate the bumble bee? He's way out in front among the stingers at pollinating clover we gather, and a British Information Services release points out that "because pollen is rich in protein and vitamins, its large-scale production could be of benefit to countries where food is short."

Tame bumble bees, we presume, would be easier to "milk," but the prospect is not likely to appeal to the average ham-fisted sod buster who's accustomed to pulling something a little more substantial.

Union Jacks are coming down all over Britain these days without any noticeable lessening of respect for Queen and country. Some enterprising irreverent entrepreneur has come out with a line of ladies' panties in the red, white and blue configuration upon which, in days of yore, the sun never set.

It's difficult to say just how much tradition means to the modern Englishman, but it's reasonable to suppose the time-honored sunset ceremonies associated with the lowering of the flag have been suspended in this instance.

On a related theme, the London Daily Sketch reports that more than a million British bottoms have been flowered and papered since the introduction of pink disposable panties early this year. British Tissues Ltd. sold two-and-a-half million pairs in a single week and they are flooding supermarkets and drugstores. "In brief," writes the Sketch, "every girl from the age of 11 to 50 is buying paper pants in packs like paper hankies."

We've had flush-a-byes here for years, of course, but the didy market was pretty well confined to the pre-pottie crowd. Retailers are cautious, but some predict the big girls will be moving into them soon just as they have in Britain. Anyone for a change?

And how does this all stand up against an underwear advertisement that appeared in the Evening Standard not so many years ago to this effect:

"A rapidly changing world regards with increasing admiration the wise conservatism of the Englishman and in no sphere is this more eloquently expressed than in his underwear."

■ As we suggested earlier, the British may have a stranglehold on the output of idiocy, but they don't have an outright monopoly. An eminent Ottawa entomologist made the headlines recently with his disclosure that, next to pigs, fleas like humans best. He went so far as to suggest they may even prefer us.

The doctor, who is in charge of fleas in the federal government's entomology research institute, reveals that man and pigs are the fleas' favorite habitats and that human beings are unique in that they are the only primate so honored.

Cats get a clean bill of health. When they do have fleas, the doctor points out, it is because man or pigs have invaded their territory.

This latter bit of intelligence may be of some comfort to the ailurophiles among us, but most will find it disturbing. The thought that we may be giving our cats fleas is a bit rough on the old ego.

In Toronto, a voluminous report on land-use planning, 12 years in the making, contains further rather shattering data. Among its revelations: by the year 2000 swimming will be the most popular outdoor recreation activity in the province; the land area of Southern Ontario is fixed; a biotic ecosystem is a life-filled volume of earth-space; a deer ecosystem is that portion of the earth's surface occupied by a community of deer.

■ Down in California, a zoologist has managed to persuade the Division of Highways to build a \$3,000 swamp. One of their road projects would otherwise have left a number of long-toed salamanders homeless.

■ Back to Britain, for a final swipe, we read that a dentist in the Isle of Man has succeeded in fitting a false beak on a great Indian hornbill. "It was similar to fitting a human dental patient," the bird's keeper explained. "We had to take an impression for the new piece and it was screwed into place under an anaesthetic." □



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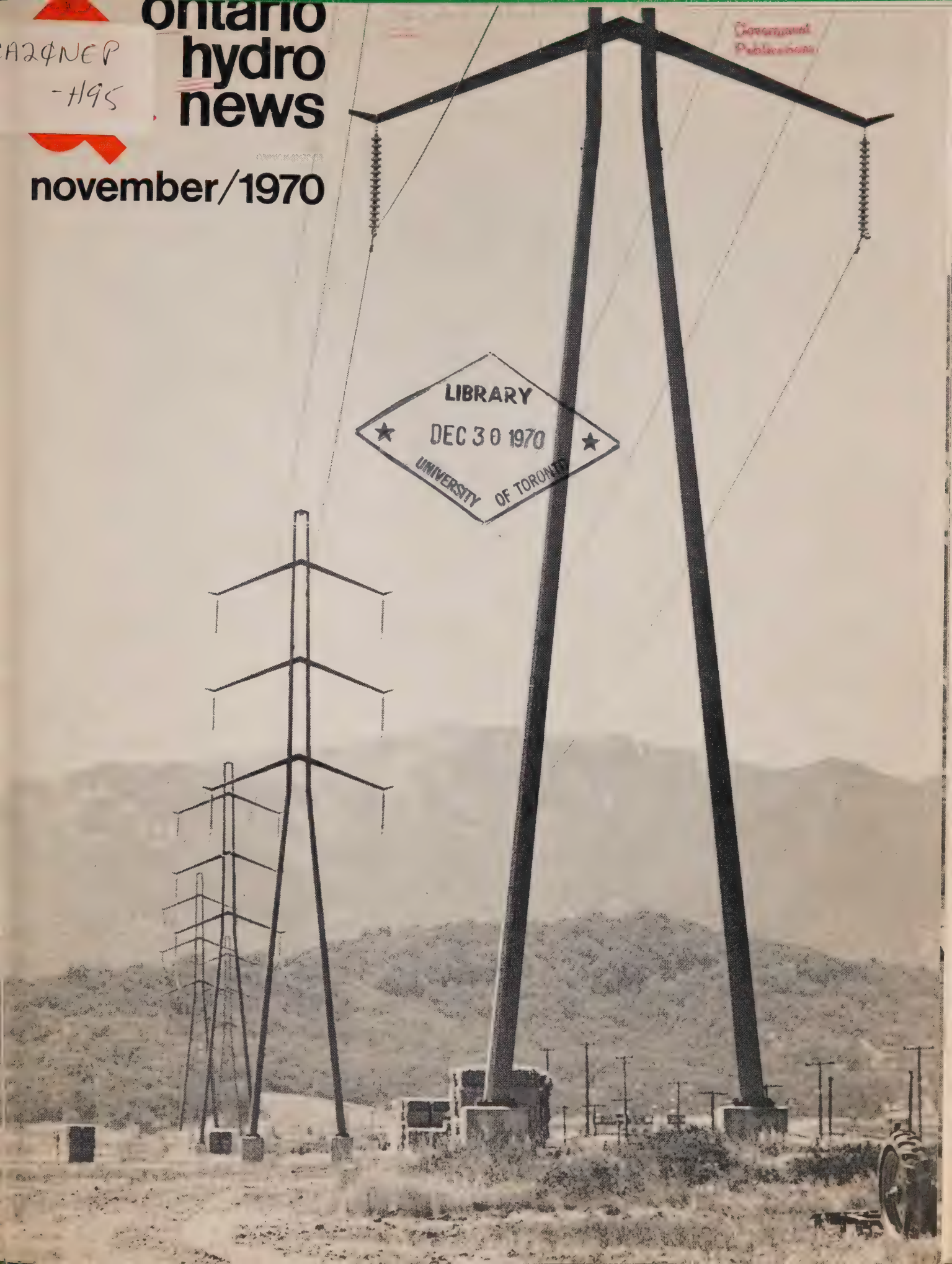
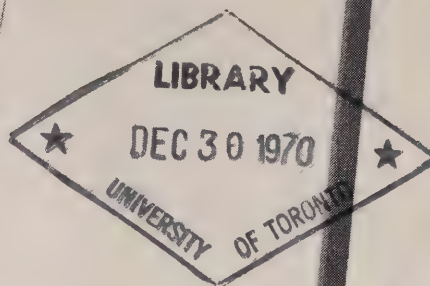
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# Ontario hydro news

november/1970

Government  
Publications







# news

## november/70

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### the cover

Steel towers of Pacific Gas and Electric's 230,000-volt transmission line near San Francisco illustrate what one design-conscious utility is doing to improve the visual environment. Sheila Kenyon discusses Ontario Hydro's approach to the problem on page 12. Cover photo: Neil McMurtrie.

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### Viewpoint

## still a bargain

Regrettable as they are, the recent rate increases announced by Ontario Hydro were unavoidable and understandable considering the many factors exerting upward pressure on costs. These include increased emphasis on pollution control, capital construction costs, interest rates and fuel shortages.

Not that Ontario Hydro is pursuing an isolated course. Utilities across North America are in similar straits. For instance, Consolidated Edison of New York, was recently granted a 16 per cent rate increase and the Tennessee Valley Authority has imposed a 23 per cent increase on its customers. Most Canadian supply authorities have also been obliged to raise rates. No reversal of this trend is expected for some time.

Yet some consolation may be drawn from the fact that electricity is still one of the best bargains money can buy. The average cost of electricity in Ontario is still less than it was 30 years ago. Rates went down from the 1.31c. a kilowatt-hour average monthly charge in 1939 to an all-time low of 1.02c. in 1949. By 1969 they had increased to 1.23c. per kilowatt-hour.

Ontario Hydro has an annual operating budget of more than half a billion dollars and is now spending a similar amount each year on construction and expansion. The utility's total committed program includes almost \$3 billion for new generation. This necessitates heavy borrowing. Last year alone, Hydro paid more than \$90 million in interest charges — an increase of \$6 million in one year. Coupled with high interest rates are increased costs brought about by the upward surge in wages.

The electric utility, unlike some business enterprises, cannot delay construction at times of high costs. The power must be there to meet the demand if chaos is to be avoided. Recent shortages in the US serve only too well to illustrate the point.

Environmental considerations, not only as far as air pollution is concerned but in the entire sphere in which the utility operates, are of paramount importance. The emphasis has changed from that of providing power at the lowest possible cost to one of providing service without disruption while at the same time meeting new social standards demanded of industry.

Up to now, Hydro has spent almost \$50 million on pollution control and more money must be earmarked for this purpose.

Also contributing to increased rates is the fact that most sources of low-cost hydro-electric power have now been tapped and Ontario has to rely increasingly on thermal-electric generation.

Operating costs are rising steadily because of shortages of suitable fuel in the US precipitated in part by stringent pollution controls limiting the types of coal that can be burned. Alternative fuels, such as natural gas and oil, will soon be in use and research is being conducted to develop satisfactory air purification equipment which could permit coal with a higher sulphur content to be used by utilities once more.

However, there is one bright spot on the horizon. And that's the development of nuclear energy. If inflation can be contained, nuclear plants may eventually bring about a levelling-off, even a reversal, in the rising cost of generating electricity. Due to start up next year, the Pickering nuclear plant, near Toronto, should produce electricity about 10 per cent cheaper than corresponding coal plants. Improving technology may make nuclear power even less expensive in the future.

But it will be a long while before improved nuclear technology will substantially influence the upward trend in the cost of power. During the 1970s electricity, like almost everything else, will cost more. □



a hydro news  
special report  
on power cost

# trends

The scope of Ontario Hydro's program to meet a 77 per cent increase in power demands by 1977 came into sharp focus this month by way of a seven-year projection of cost trends.

A summary of the forecast, prepared to assist Hydro in long-term planning, has been released to inform the public of the direction of present cost trends and their ultimate effect on rates. Although the projections originate during a period of economic uncertainty, they reflect expected growth in the provincial economy to 1977. Estimated power demands correspond with the long-term average annual increase for the past five decades.

Some 10,300,000 kilowatts of new generating capacity will be developed in the seven years from 1971 to 1977 at a capital cost exceeding \$5.1 billion. Additions will double the generating capacity in service at the end of 1969.

These power projects are now under way, except for the proposed additions to the coal-fired Thunder Bay plant tentatively planned for 1976-77. They include Lower Notch hydro-electric plant, Lambton, Nanticoke and Lennox fossil-fuelled stations, Pickering nuclear power station and the first two 750,000-kilowatt units at the Bruce Nuclear Power Development.

The projection indicates there will be a greater impact on the wholesale cost of power to the 350 municipal utilities and other customers than had been previously forecast (Municipal utilities consume 62 per cent of the electricity delivered by Ontario Hydro).

In the period to 1977, the wholesale cost of power may increase by a total of 49 per cent if current assumptions prove correct. Reasons for the indicated increases are explained in a subsequent section.

On November 2, Hydro announced an average increase in wholesale rates to utilities of 7 per cent for 1971. The increase for 88 large industrial customers served directly by Ontario Hydro will be 8 per cent. These rates are effective January 1, 1971. (An increase in rates for Hydro's 600,000 rural customers was announced earlier).

Some municipal commissions will be able to absorb all or a portion of the increase and others will be forced to pass it along. In the long run, the higher costs will affect municipal rates.

## rates in perspective

The cost of electricity to the average residential customer in 1969 in Ontario was \$7.86 a month. This year it is estimated at \$8.50.

If the seven per cent increase in wholesale rates is passed on to the retail customers by the municipal electric utilities, the additional cost per customer would be about 60 cents a month or two cents a day.

Assuming the entire wholesale cost increase is passed on by the municipal utilities, the 60-cent-a-month increase would be less than the price of a package of 25 cigarettes, or a three-quart jug of milk or a pound of butter.

The average cost of electricity per day for a family is about 30 cents. This is roughly equal to the price of a loaf of bread or one-quarter pound of sirloin steak.

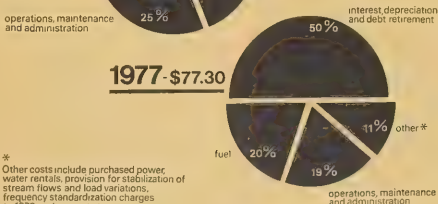
The Hydro bill accounts for only a small percentage of income. A man earning \$6,000 a year would work only six minutes in an eight-hour day to earn the 30 cents needed to pay for all the electricity used by his family that day.

## bulk power cost per kw

**1969-\$48.70**



**1977-\$77.30**



\* Other costs include purchased power, water rentals, provision for stabilization of stream flows and load variations, frequency standardization charges to 1973 and property taxes.



## power essential

Who are the major users of power in Ontario? The answer indicates why electric energy is essential to modern living and, in fact, to economic growth.

About 70 per cent of the electricity generated by Ontario Hydro is used by industry and commerce. Farming and food production account for another significant amount.

Urban residential customers account for about 25 per cent of electrical consumption. Of this, by far the greatest amount is used for purposes considered essential, including home heating, lighting, water heating, cooking and laundry.

Failure to meet demands could lead to energy shortages similar to those experienced last summer by a number of US utility systems and various groups of consumers would experience either inconvenience or economic hardship.

## spending in perspective

The \$5.1 billion program to meet essential demands is greater than the cost of all plant in service at present. But the 1971-1977 program should be considered in the light of the expanding provincial economy.

By 1977, if present trends continue, Ontario's population could rise by almost 11 per cent to more than 8½ million. The gross provincial product, the total value of all goods and services produced in Ontario, might increase as much as 60 per cent to \$60 billion and per capita income by perhaps 45 per cent to about \$5,500.

## sources of funds

Hydro obtains funds to carry out its construction program and operate the system from two main sources—revenue from the sale of power and funds from the issue of Hydro bonds. Thus, close attention must be paid to the level of Hydro rates and the closely related task of maintaining a sound financial position.

These are essential to enable Hydro to raise funds to refund maturing indebtedness and to finance the Commission's capital expansion program.

Efforts to maintain a good credit standing apply to capital markets in Canada and abroad because about one-half of Hydro's borrowing requirements to 1977 is expected to be derived from foreign sources.

## rising costs

Like all organizations, Hydro has been facing inflationary costs for goods and services. The effects of high interest rates in recent years, for example, have been built into Hydro's cost structure and they will inevitably continue to be reflected in power costs for many years.

Some of the cost factors, however, are related to the unique situation faced by electrical utility systems in general and by the Hydro enterprise in particular:

- Expansion cannot be deferred if power demands are to be met on time

- This year, thermal-electric generation represents more than half of Hydro's total capacity for the first time. This trend will become more pronounced by 1977 when hydro-electric plants are expected to supply only about one-third of Ontario's power needs. (Nuclear power stations are costlier to build than fossil-fuelled plants, but fuel costs are lower. If hydro-electric resources remained to be developed, such plants, too, would face high capital costs at today's interest rates).

- An expanding power network requires a greater margin of reserve generating capacity and more sophisticated control equipment to ensure reliable, continuous service

Consequently, major items forcing up hydro rates are interest, depreciation and debt retirement charges and fuel costs.

On a recent 25-year bond issue, for example, Hydro had to pay 8½ per cent to raise \$75 million. This compares with rates that averaged 4 per cent in the '50s and 6½ per cent in the '60s. Interest rates are expected to ease somewhat in the '70s but indications are that strong demands for capital from various sectors of the economy will keep rates in the vicinity of 8 per cent.

The average price for coal is expected to increase from \$8.95 a ton in 1969 to about \$13 a ton in 1977, coupled with greater reliance on fossil-fuelled generation.

In fact, increased consumption of fuel and higher prices have already added significantly to Hydro costs. Expenditure on fuel has jumped in the last four years from \$35 million to an estimated \$86 million, an increase of 148 per cent.

Environmental costs have also become a major budget consideration. As one example, Hydro is spending about \$13 million at the R. L. Hearn generating station in Toronto to control air pollution. Use of natural gas and low-sulphur coal to reduce pollution adds to costs as well.

Other important factors include an increase in the reserve generating capacity required for an expanding system—from 11 per cent in 1969 to 26 per cent in 1977—and increased depreciation and debt retirement charges due partly to the shorter life of thermal-electric units.

Thereafter, the generating reserve, a buffer between demand and capacity, will decrease by 1980 to approximately its current level.

## fund used as cushion

A strong rate stabilization reserve fund is essential to maintain Hydro's financial stability and credit rating. It protects customers against erratic rate changes caused by unforeseen contingencies such as economic ups and downs, low stream flows, fluctuations in the Canadian dollar, major equipment damage, and delays in getting equipment into service.

Next year, for example, withdrawal of \$45 million from the fund is planned to reduce the level of rate increases that would otherwise be necessary.

The reserve is designed to smooth out pronounced fluctuations in the cost of power from year to year rather than to offset the long-term trend. If withdrawals were made to avoid rate increases, the fund would be quickly drained and, instead of a prudent financial policy, Hydro would store up trouble for another day.

Hydro's reserve fund is considered low in comparison with similar funds maintained by some other utility systems.

As the assets, obligations and scale of operations grow, the reserve must increase if it is to meet the requirements for which it is intended.

However, the effect of next year's planned withdrawal will lower the reserve as a ratio of total assets which now exceed \$4 billion. Between 1971 and 1977 it is forecast that this ratio will continue to decline.

The amount of the fund, which functions somewhat like an insurance policy, is essentially a matter of good judgment. It is kept under continual review from the standpoint of purpose and size.

## comparing rates

If municipal utilities pass on to retail customers the 7 per cent increase in wholesale rates next year, electricity will still be a good bargain. Comparisons given with the accompanying diagrams illustrate that the Hydro bill accounts for a small part of an average person's income.

By contrast with other utility systems, Hydro rates compare favorably. Latest statistics available from the US Federal Power Commission show that at 750 kilowatt-hours, close to the average residential use in Ontario, only Tennessee and Washington state had lower rates.

Most utility systems have raised rates this year by 10 to 25 per cent. These include Canadian Utilities in Alberta (15 per cent), Hydro Quebec (10 per cent), British Columbia Hydro (13 to 15 per cent), Tennessee Valley Authority (23 per cent) and Consolidated Edison, which serves New York City (16 per cent). Manitoba Hydro is contemplating a 14.5 per cent increase.

## controlling costs

Hydro's highly competitive rates are the best measures of its efficiency. In recent years, for example, the quest for better ways of doing things has led to installation of larger generating units, increased automation and tighter controls on costs. During the past decade, Hydro's power system doubled in size but staff has increased by only 43 per cent. Future projections show an increase in administration costs per kilowatt to 1973, then a steady decline to 1977.

Over the horizon, the next generation of Canadian nuclear reactors promises lower capital costs and greater efficiency in producing low-cost power. Research is also being carried out into more efficient means of generating power from conventional fuels.

## changing the outlook

The seven-year cost projection is based on certain assumptions. Some of these assumptions, for example, hinge on forecasts of power demands which could vary.

One way to offset the higher cost of power, at least in part, would be by filling in the valleys between peaks or highs in power demands to make the most effective use of Hydro's costly facilities. Stations must be built to meet peak demands but, if kept in use during the off-peak hours, they produce additional revenue to offset higher costs.

Success in diversifying the pattern of power use, particularly by municipal electric utilities, could produce a significant improvement in the 1977 cost picture. □



# crossroads of the north

How a keg of nails made North Bay the place it is today • Rae Hopkins





*Signs advertising the sale of hunting licences contrast sharply with the bustle of North Bay's business district. New utility offices, right, add considerably to the city's amenities.*



An arrow-shaped neon sign advertising moose licences points to a small log building just a few feet off the main highway at the north end of town.

After laying out his \$15 in that small hilltop structure nestled among the tall pines and hard maple, the aspiring hunter wouldn't have to travel too far to spot his prey — even though he's still well within the city limits.

For this is North Bay, which with 128.9 square miles is Canada's second largest city — Calgary is first — in terms of area. And much of it's moose pasture.

Police Chief William Wotherspoon says the sight of a moose charging through the city's built-up area isn't all that uncommon. "Matter of fact, we had one — a cow — racing all over town last year. It finally dropped dead from exhaustion in someone's backyard.

"In summer, we still see deer and bear chased out of the bush by the flies," he adds.

But North Bay — population 46,596 and growing — has more than wildlife upon which to stake its claim to fame. From the earliest times, the area has been a gateway to the North.

Brûlé, Nicolet, Champlain, Brébeuf, and many others made their headquarters in the area in the 1600s. Here was the jumping off point between Montreal and the West. The voyageurs came up the Ottawa River and across a chain of lakes and rivers to Lake Nipissing, down the French River to Georgian Bay and across the Great Lakes to Chicago. From there, they headed west.

North Bay's modern history — and its name — came with the arrival of the Canadian Pacific Railway in 1882. In that year, an enterprising young railway employee, John Ferguson, decided to build himself a house on the shores of Lake Nipissing



and ordered a keg of nails to be delivered to the "north bay of Lake Nipissing."

Actually, the bay is more imaginary than real, but from that day the site, later chosen as a division point by the CPR, has been known as North Bay.

North Bay owes its location to the fact that the practical running distance for trains in those days was 120 miles. They were called "wood miles" because at the end of 120 miles the crew had to take on another load of wood to stoke the boiler. Leaving Chalk River in the Ottawa Valley, the train ground to a halt at the place where Ferguson's house would be built.

Four years after the arrival of the CP line, the old Grand Trunk Railway (now Canadian National) pushed through its line from Toronto to North Bay. And shortly after the turn of the century, the Ontario Northland Railway established its southern terminus here to make the town a jumping-off point for the remote mining communities of the north.

The small town remained a railway centre until the coming of diesel-powered locomotives capable of travelling vast distances without refuelling. However, it still remains the southernmost point and headquarters of the Ontario Northland Railway, and it will as long as the Precambrian Shield continues to provide close to one-quarter of Canada's mineral wealth.

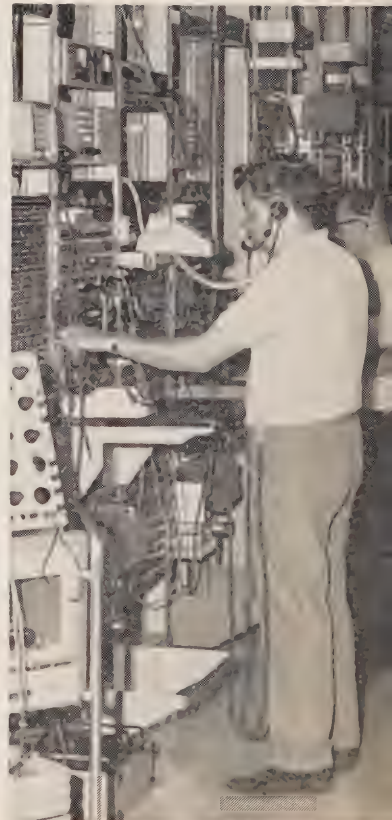
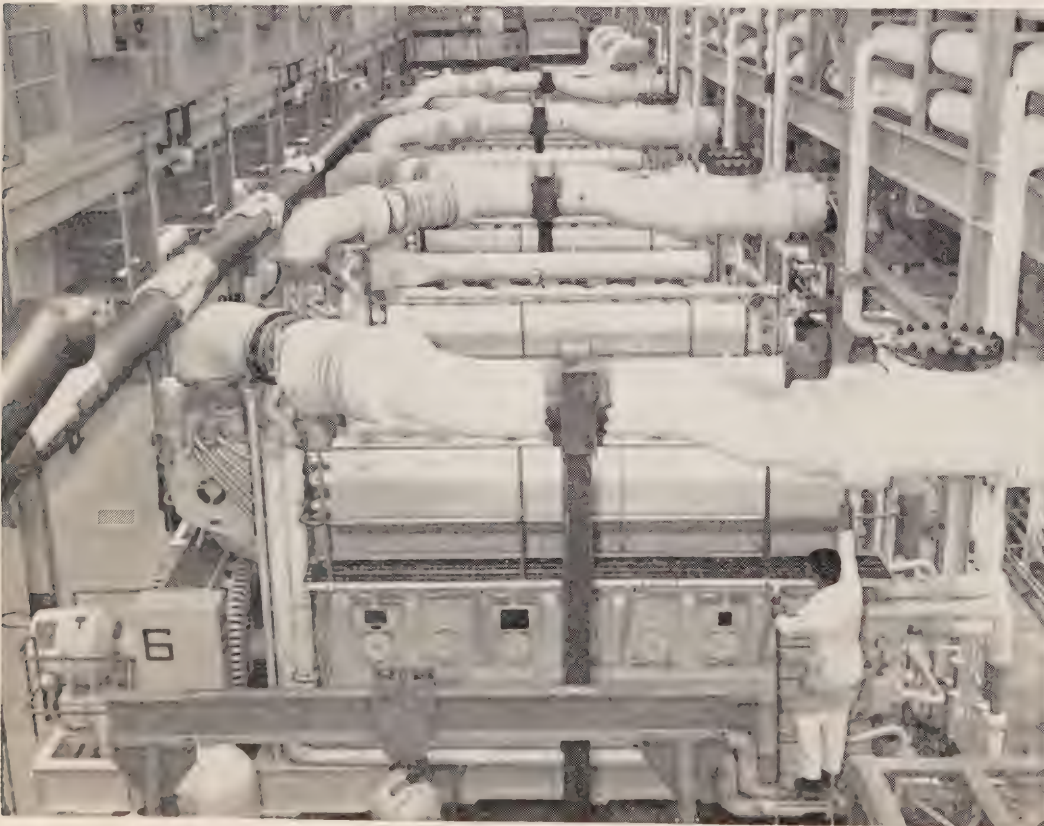
The passing of the railway era led to a brief decline in the economy, but it didn't daunt the spirit of its people. Secondary industries connected with mining and forestry have since taken up the slack and tourism pumps close to \$15 million a year into the local coffers.

Most of the explosives used in the mines and much of the mining machinery are manufactured in the city.











*Air defence of much of the North American continent is directed from the NORAD installation deep underground. Yet above the emergency generators, complex communications equipment and heavy blast-proof doors lies a peaceful rural scene. CF-100 was placed in city park as a tribute to local fliers.*



Defence is also big business in North Bay, which is headquarters for the Canadian Forces Air Defence Command and for the northern region of the North American Air Defence Command (NORAD). Close to 3,000 Canadian and US servicemen work in this underground headquarters set deep inside the Laurentian mountain range. It is from here that the air defence of much of the North American continent is directed.

Again, North Bay was chosen as the NORAD site partly because of its excellent geographical position and its well-established road and rail networks.

North Bay hasn't been Canada's second largest city for long. Only in 1968 did annexation of two adjoining townships, West Ferris and Widdifield, make it that way. Before then, the city covered a mere three-and-a-half square miles.

The annexation has meant much to North Bay Hydro, which took over responsibility for the Widdifield and West Ferris systems with the merger. It meant the maintenance of an extra 145 miles of distribution line and the addition of more than 6,000 customers to the North Bay utility.

Electric power was first provided to the community as early as 1885 from a steam-driven generator belonging to sawmill owner J. M. Bourke. The power was used to operate the mill during the day and illuminate the town in the evening. North Bay Light, Heat and Power Company sprang from these early beginnings, but the entire system was purchased by Ontario Hydro in 1916.

North Bay Hydro was formed in 1940 to distribute power within the municipality, buying electricity wholesale from Ontario Hydro. Its first chairman was N. J. McCubbin, father of the present chairman, Bruce McCubbin.

On its formation, the utility's assets were estimated at \$410,000. Today, Hydro officials put its value at more than \$6 million. And only last month was an impressive office and service centre opened which brings all the utility's staff and equipment under one roof.

In the last half-century, North Bay has come far as a well integrated and thriving industrial community. But the fact that the undeveloped northland lies at its doorstep is never completely forgotten. Indeed, its citizens look eagerly toward the North and the opportunities and challenges that it offers.

No better example is provided than the city's annual fur sales, which have sprung to prominence in the last five years to become the world's largest wild fur auctions.

In spite of falling world prices, last year's six auctions netted about \$2,350,000 from the sale of pelts. Brokers from Montreal, Toronto and New York bid for everything from beaver to bearskins on behalf of major buyers in North America, Europe and Asia.

"Beaver accounts for about 60 per cent of our volume and the bulk of the skins come from Ontario and Northwestern Quebec," says Gerry Martineau, assistant manager of the Ontario Trappers Association. "However, we have now extended our service to any trapper in any part of Canada and we're receiving pelts from Assumption to Newfoundland."

Somehow, the success of these sales exemplifies the spirit of this modern cross-roads. Come to think of it, John Ferguson really started something 88 years ago with that keg of nails. □



# revolution in the office

About the time a group of solemn men established a new nation named Canada, a tired Milwaukee inventor called Christopher Latham Sholes borrowed a crumpled piece of carbon paper from a friend (carbon paper in those days was expensive and difficult to obtain).

In his workshop, Sholes placed his second-hand carbon paper carefully on top of a piece of glass set in a metal frame which supported a morse key attached to a lever. When the lever was pressed against the glass, Sholes found he had produced the letter "W". He moved the paper and "WWWWW" was repeated across the surface. From this humble beginning the typewriter was born.

Sholes' writing machine was slowly modified and produced great animosity among clerks who had practised for years to perfect their copperplate handwriting. But despite their antagonism, the invention prospered. Mark Twain bought a machine and sent his publisher the first typewritten manuscript. It was part of "Tom Sawyer". Twain is said to have paid \$125 for his typewriter.

Since then, the typewriter has figured in the development of many kinds of office machines using its keyboard or modifications of it. However, one of the main reasons for the rapid proliferation of such machines in recent years is electrification and the increased efficiency it brings.

One of the first really important machines to benefit from electrification was, appropriately enough, the typewriter. IBM produced one as early as 1935, but it was not until after the second world war that the electric typewriter really began to oust the standard model from many offices. According to a research study prepared by the Olivetti Company of Italy, 50 per cent of the world's typewriters were electrically-powered in 1968. By the end of 1969, this percentage had climbed to 55 per cent. In industrialized countries such as Canada, the proportion of electric typewriters is even higher.

All the most important office machines

reach their peak of efficiency in electric models. In addition to the typewriter, the adding machine, the photocopy machine, the duplicator, the telephone answering machine, the dictating machine, and the postage meter are everyday tools of modern business. But they're only a beginning.

Equipment which wasn't even on the drawing boards 10 years ago is coming to the fore to help business cope with the flood of information produced by the computer. And the average businessman has a difficult task keeping up with what is available to him as we rush into a new decade.

"The flow of information courtesy the computer," reported Business Week in a special report, "has become a river and by the seventies will become a flood." The magazine predicts that future management will have to free the president of a company from other chores just to handle this deluge of information.

However, the key to successful use of electrical office equipment lies in the smooth running of the system. Simply surrounding employees with sophisticated tools is not enough.

"No piece of equipment that is to become an integral part of an office system will perform at peak capacity unless the entire system — form design, paper handling, right down to utilization of employees — is studied and revised," says one expert.

In fact, the manufacturers of electrical office equipment employ specialists who will design systems for a company or government operation.

One of the new technologies emerging to assist business, for instance, is the use of microfilm. The storage and quick retrieval of documents is becoming a problem and business sees in microfilm an answer to cut down on storage space and provide readily available information. Interest has reached a point where the Canadian Micrograph Society is pressing government to make microfilm copies equal to an original document in the eyes of the law.

At the present time, business is obliged to store original paper documents for a five-year period.

Metropolitan Toronto Police Department uses a microfilm information retrieval system to find accident information rapidly. Accidents are recorded by the names of persons involved, location of the accident or by date and can be traced by a combination of these items. The system is set to retrieve any one of more than 900,000 pages of information in less than 15 seconds. Under the old filing system, it took a clerk about 15 minutes to find the information and the records took up enormous space.

IBM system experts working with government personnel helped Prime Minister Trudeau to overcome his correspondence problem. The Prime Minister was receiving many thousands of letters a month — about 300 letters a day had to be answered. By using modern equipment, it was possible to set up a card system of specific answers to citizens' questions. With the correct selection of cards, the bulk of the Prime Minister's mail is answered by means of an automatic typewriter. Space is left for the address and other information that needs to be typed in.

IBM makes one of the world's most sophisticated typewriters with a magnetic tape "memory". Looking very forbidding to the novice, it's an ideal piece of equipment for a company producing lengthy reports. Instead of a girl typing copy over and over again as corrections are made, it merely types the copy once and it is automatically recorded on magnetic tape. Any corrections are typed in separately and stored on tape until the final draft is required. It's then automatically typed up at the push of a button.

In the field of photocopying, great strides have been made in recent years. A spokesman for 3-M reports that color attachments are becoming available for photocopiers. Colored copies will cost about 50c. each and the machine will range between \$3,000 and \$4,000.



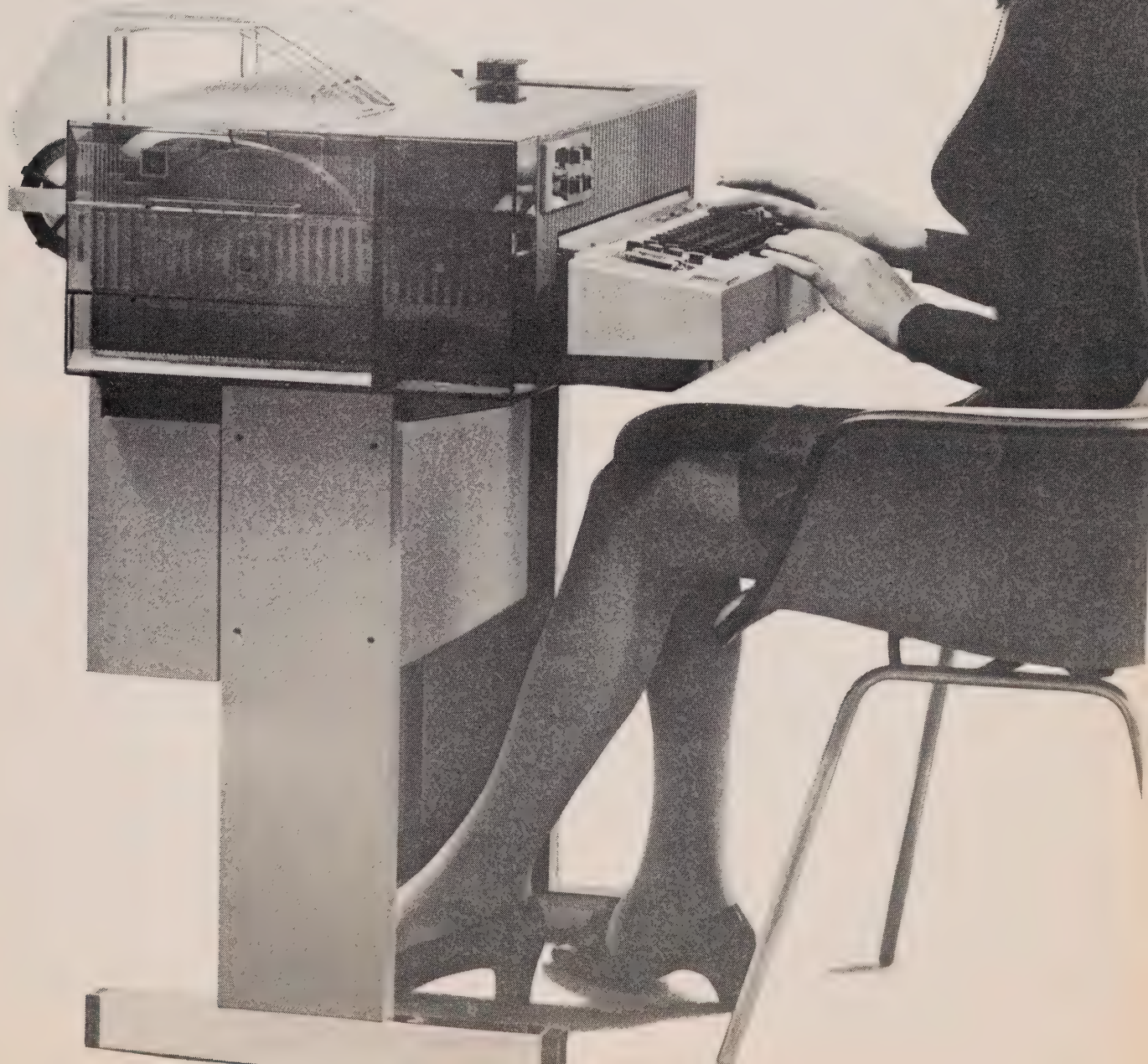
Christopher Sholes got the proponents of copperplate handwriting all hot under their starched collars.

But even he couldn't have foreseen the repercussions of his machine.

by Sheila Kenyon

The four types of copying machines available to Canadian business provide a wide range of choice, run from under \$100 to several thousand and give various standards of production. Photographic copiers requiring photo-sensitive paper are good for low-volume production, are

inexpensive to use and give good reproduction. Heat transfer copiers use heat-sensitive paper and provide moderately good copies, but they have a tendency to fade. Diazo process machines, which make copies suitable for use in overhead projectors or as blueprints, are expensive







*Copy need only be typed once on this machine with a magnetic tape "memory." Corrections are typed in separately and stored on tape with the original draft. The final document is then typed up automatically at the push of a button.*

and copy only from translucent paper. Electrostatic copiers use a powder transferred to paper to make copies.

While companies and institutions with enormous workloads can justify operating electronic equipment on a 24-hour basis, smaller businesses can take advantage of the new technology through service bureaus. Commercial service bureaus in

Canada rent time on practically everything from computers to microfilm systems, mailing equipment, and copying and duplicating machines down to two new services — facsimile transmission networks and optical character scanning equipment.

Facsimile transmission equipment allows the transmission of a document over telephone lines from one office to another within seconds. One company offering such equipment rents a combined transmission and receiving device for about \$85 a month.

Optical character recognition is one of the new technologies for handling computer input. One new Canadian company, Commerce Optimization Services, will be providing service to business and industry in the near future. The equipment reads documents printed with specially designed

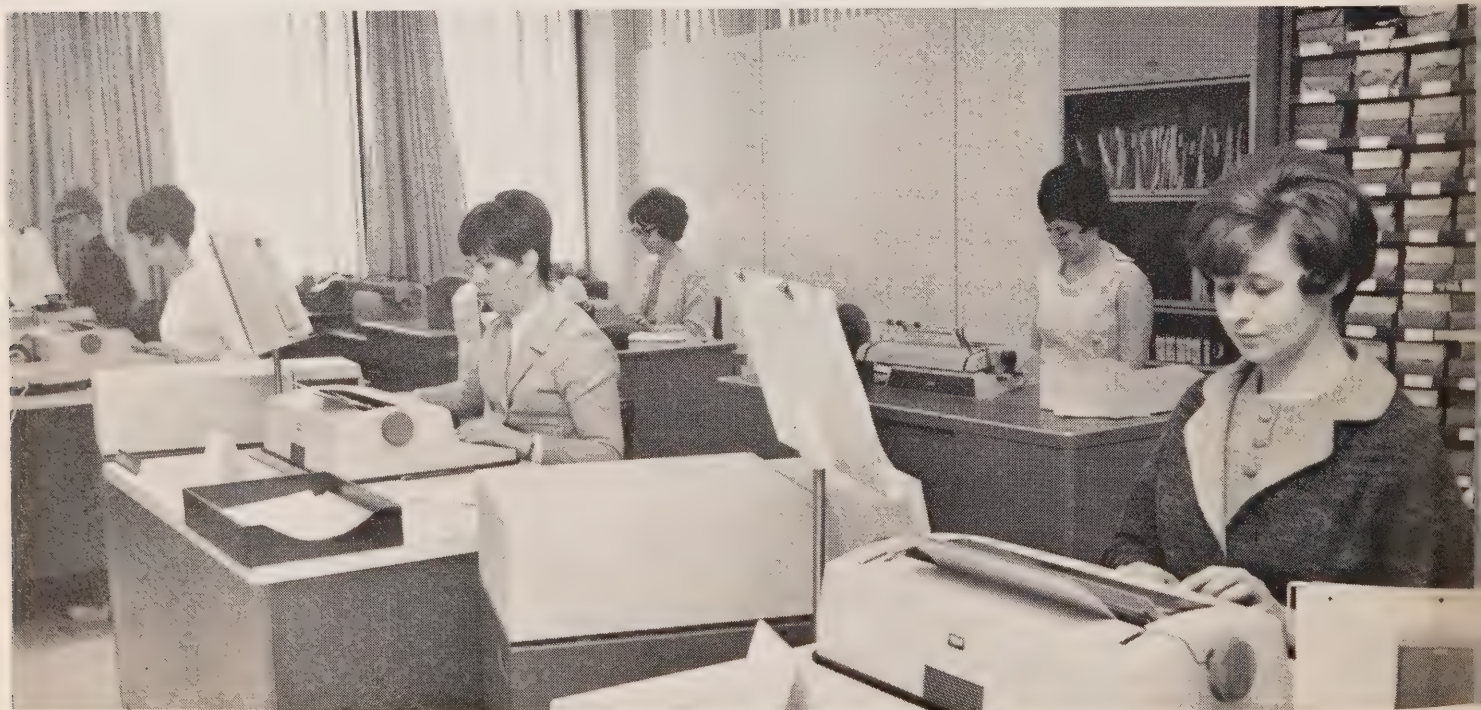
characters and converts this information into magnetic tape for computer input, thus dispensing with the need for key-punching.

Improved communications with computer is emerging in the wide use of terminal equipment — from a plug-in telephone for a salesman in the field to a calculator machine for the small business that can be hooked up to a computer on a time-sharing basis.

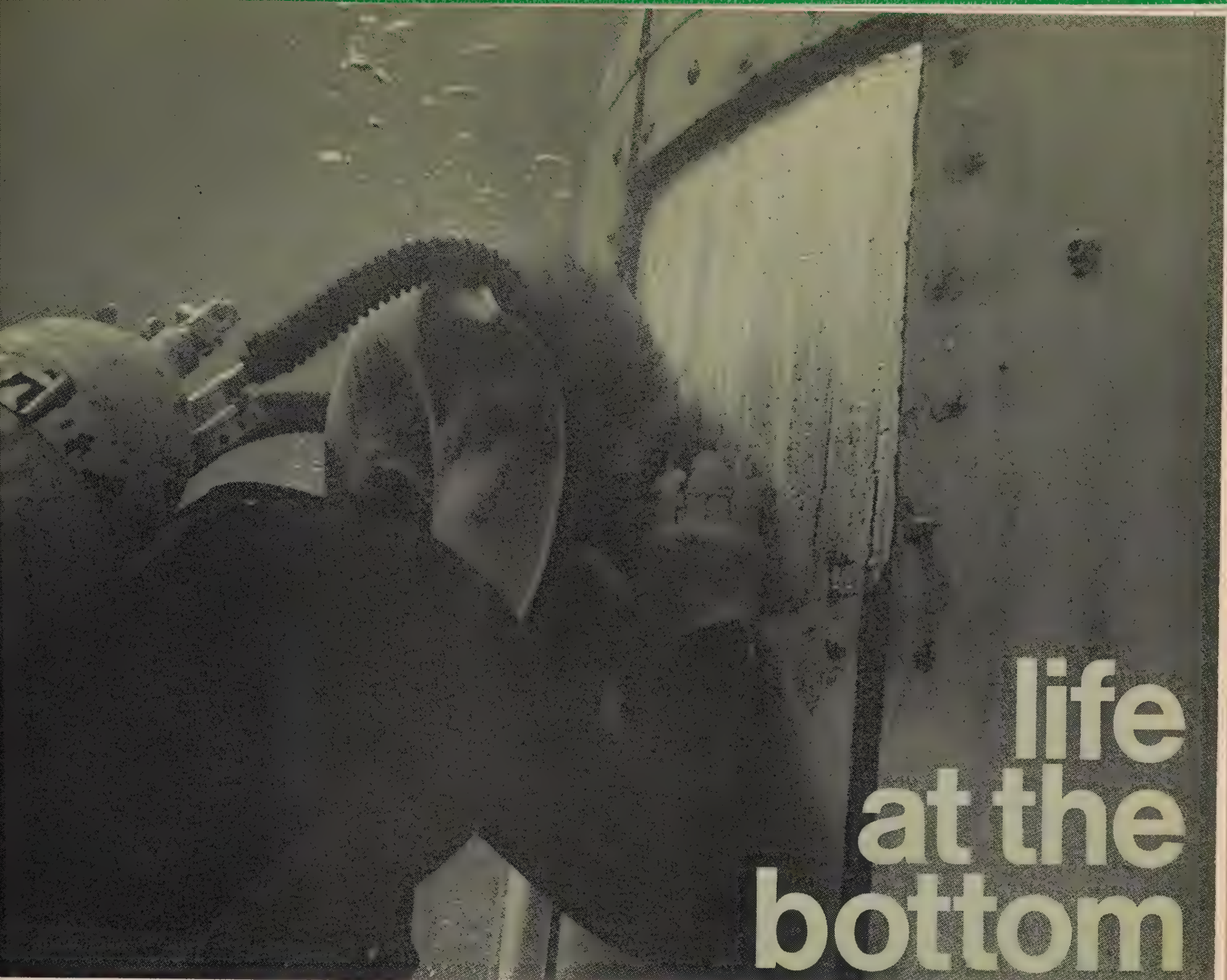
In fact, the growth of the computer industry has been so dramatic that Mers Kutt, president of Consolidated Computer Services, predicts it may become the biggest industry in the world in the foreseeable future.

If only Christopher Sholes were alive today

*Although the most universal of office machines, the typewriter has figured in the development of many kinds of office equipment using its keyboard or modifications of*







# life at the bottom

by Lois Lane  
photos: Ted Johnston

Almost unnoticed, a small colony is taking shape . . .  
beneath the waters of Georgian Bay.

Each year sees the frontiers of outer space and the ocean depths pushed back a little further. And a young Canadian has brought the message home with the establishment of the world's first submerged, freshwater colony just off Tobermory in Georgian Bay.

Dr. Joseph MacInnis, of Toronto, is the man behind the venture, which includes two underwater habitats, with a third on the way.

Dr. MacInnis' first habitat, called Sublimnos, sits 33 feet down at the bottom of Little Dunk's Bay. Georgian Bay was selected because of the clarity of the water and the Tobermory site is of special interest to divers due to the presence in the area of more than 50 wrecked vessels.

The 300 cubic foot steel habitat is equipped with a large viewing dome and four



observation windows. It is used by divers night and day throughout the year and is accessible through a cuff-like opening in the base of the unit.

To supply Canada's first underwater building with electric power, Ontario Hydro has provided a 10-kilowatt diesel generator. This is used to pump fresh air into the habitat and provide hot water for the heating system. "We also heat the divers' wet suits during cold weather by circulating 85 to 90-degree water through an umbilical cord," says project manager Keith Evans.

Lighting inside Sublimnos is battery-powered and at night attracts thousands of curious fish.

"Last winter we had bad luck with our services, which were damaged by the ice. However, this fall we plan to run the air and hot water lines through a 12-inch

pipe and batten it to the rocks," says Mr. Evans.

Two men can work from six to eight hours in Sublimnos, which was towed from Tobermory harbor 14 months ago. It's anchored to the bottom by 10 tons of iron pellets.

A sister vessel was added to the underwater colony in mid-August. The SPID, short for Submersible, Portable, Inflatable Dwelling, is much like a fat rubber tube, eight feet long and four feet in diameter. As it was submerged, it was inflated so the internal air pressure was equal to the water pressure.

As on Sublimnos, the entrance is through an open cuff-like portal. Supplies and equipment are kept in watertight containers and closed-circuit television is planned aboard SPID, which was developed for the US Man-in-Sea project. This particular

vessel was used in the 49-hour saturation dive at 432 feet by Robert Stenuit and Jon Lindbergh, sponsored by the National Geographic Society and the Smithsonian Institution in 1964.

The next underwater addition will be Igloo, an eight-foot acrylic sphere with a aluminum stand. Allowing a 360-degree viewing area, this new habitat is destined for Arctic waters in a year's time, but will be tested at Tobermory this winter. Igloo will be the first underwater habitat built in Canada. The others were manufactured in the United States.

If they need to converse with their companions either in the dwellings or on shore, divers working on the lake bed have been provided with an underwater telephone booth. Within its plastic bubble, they can remove their breathing gear and talk freely as on land. Air in the bubble can be purified from their scuba tanks.

The ocean habitats built so far have cost millions of dollars to build and maintain. In comparison, these Canadian shallow-water habitats range from \$10,000 to \$30,000. At this price, most universities could afford one for their biological and geological studies.

At 32, Dr. MacInnis already has a string of accomplishments to his credit. In 1961 he was the life-support physician for Phase Two of the US Man-in-Sea project while the following year saw him direct more than 75 experimental dives for Ocean Systems Inc., 10 of which were to 650 feet. In 1967 he was scientific director of the deepest and longest dive made by man. Here, in the Gulf of Mexico, two divers lived and worked at 650 feet for 53 hours.

The MacInnis Foundation, which directs the habitat project, has literally thrown open its doors to scientists and the general public alike.

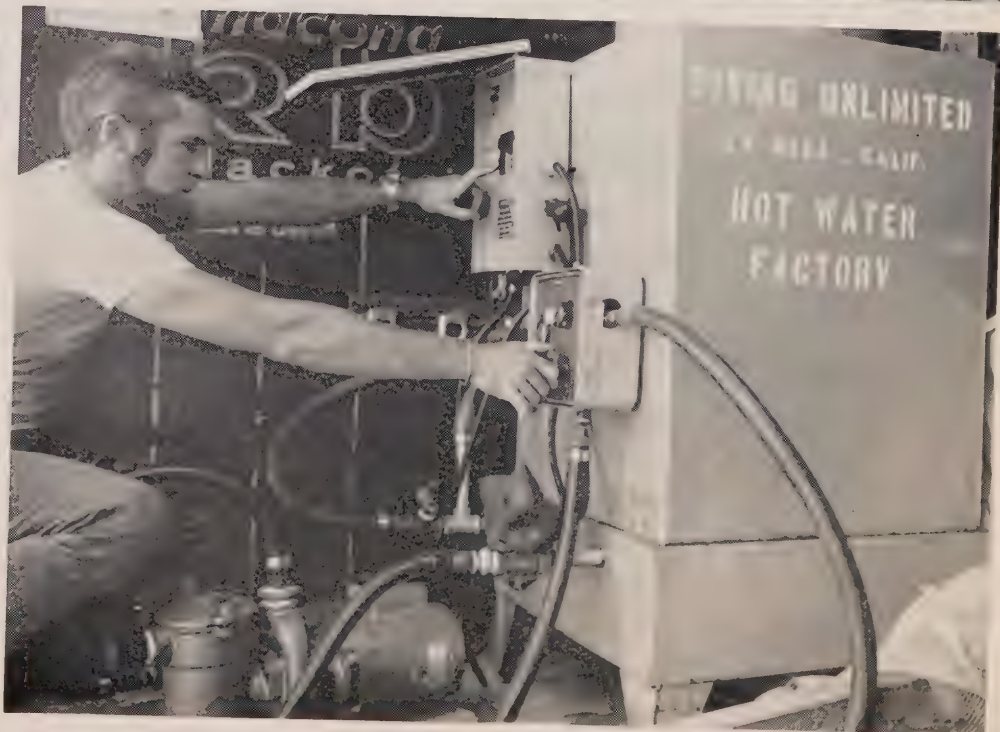
So far, biology teams from the University of Guelph and the University of Michigan have used Sublimnos as a base for marine life studies. One University of Guelph student, Larry Bell, has become a permanent resident, supported by a National Geographic Society grant to study the total environment at the bottom of Georgian Bay. □

*Diver is about to stick his head into an air-filled plastic bubble. From there he can communicate by telephone with the shore.*





Student biologists get their instructions for specimen-collecting trip from habitat's permanent resident, Larry Bell. Mr. Bell is also seen logging running time of generator provided by Ontario Hydro and starting up water heater.







# THE SHAPE OF



# THINGS TO COME

In and around the cities, open space becomes increasingly precious. That's why progressive utilities are trying to improve their rights-of-way for the good of the community.

Something extraordinary is obviously afoot when foresters start looking at scores of experimental plots of grass, design engineers doodle strange shapes on paper and transmission engineers pack their bags and travel the length and breadth of the continent.

Indeed, their mission is concerned with one of the most neglected aspects of the power business — aesthetics. And the first stage is to examine the feasibility of changing and redesigning the transmission system that carries Ontario's electric power along the thousands of miles of rights-of-way serving the province.

"Environmental factors seem to be uppermost in the minds of most people," says Jack Cassan, who heads the research aspect of Ontario Hydro's transmission line program. "Part of our concern is to make more efficient and more aesthetically acceptable use of Hydro rights-of-way."

Mr. Cassan is a member of a steering committee set up to investigate how Hydro could best redesign its transmission system to meet these needs. The committee, made up of representatives from engineering, forestry, operations and research, has already completed considerable preparatory work.

But any changes will be gradual because little attention has been given to aesthetics in overhead line design over the years. Traditionally, there has been little incentive. Now, with the tremendous attention





focused on the environment, all that has changed.

Hydro's task is twofold: to improve the appearance of rights-of-way it already owns and to decide on a policy for new rights-of-way.

"The area we are looking at is mostly Southern Ontario and any radical design changes will take place in a 50-mile radius of urban communities," says Mr. Cassan.

To keep abreast of power demands, the provincial utility must work five to 10 years ahead. According to R. E. Westwood, transmission and distribution projects engineer, Hydro will have to acquire 1,500 miles of right-of-way in the next five years.

It's all a long step since that day in 1888 when William Barber first transmitted power along a two-mile line from the river to his paper mill in Georgetown, Ontario.

A glance at a Hydro map today shows transmission lines as long red arteries, carrying electrical energy in all directions across the province. Broken red lines indicate transmission lines under development that will carry power from the huge fossil-fuelled and nuclear plants being built.

The old four-legged towers have given good service. Some of the original towers built in 1907 and radiating from Niagara Falls are still in use. Transmission lines erected in the mid-twenties in the then farm communities of North York and Scarborough are now in the heart of suburbia. These practical lattice steel structures, once on view to grazing cows, are now seen by suburban housewives entertaining their friends at tea in the garden, or on the balcony of their high-rise apartment. Aware of the public's reaction to these unsightly towers, Ontario Hydro engineers

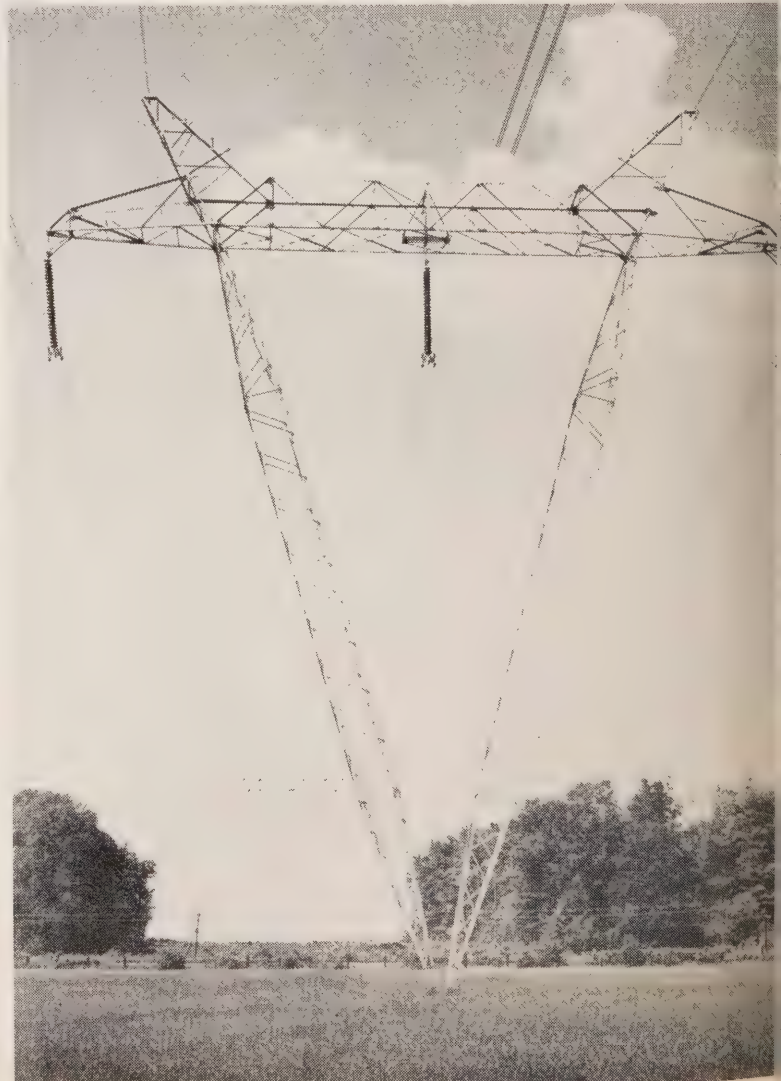
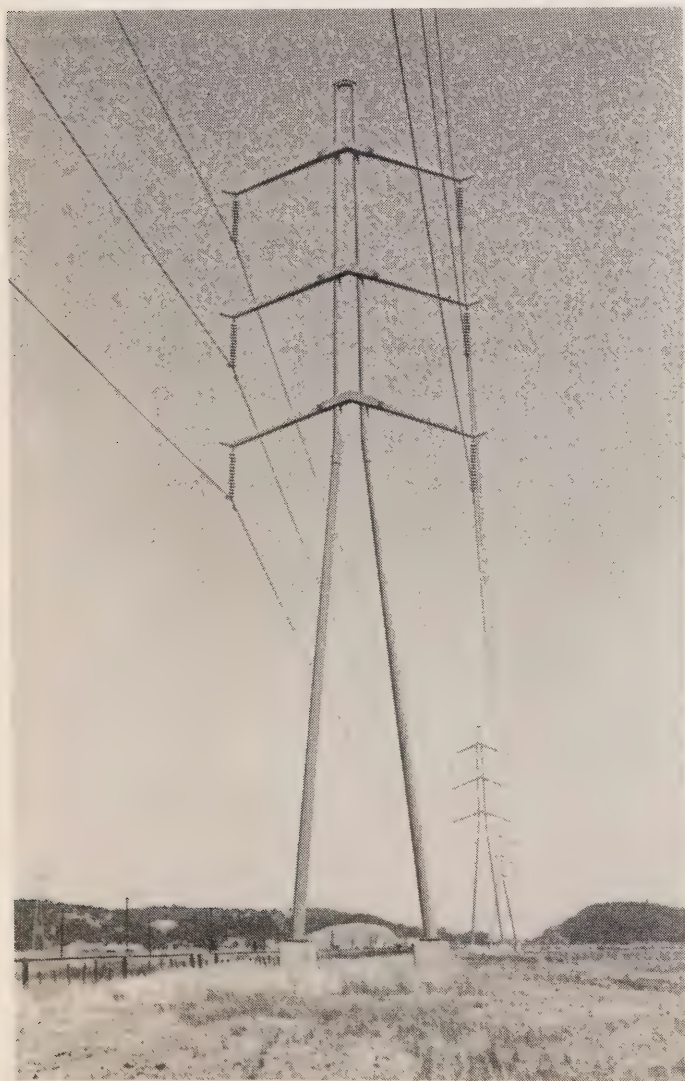
are hard at work, collecting and assessing ideas and suggestions.

"There are new materials and new techniques in the early stages of development that could eventually be used to make radical improvements," says Mr. Cassan.

The research side of the program is aimed at improving the appearance of transmission towers, reducing the height of the towers and the number of lines required, improving the overall system and producing an aesthetically acceptable tower structure at a much lower cost than those being introduced by some US utilities. Private industrial designers have been engaged to assist in the program.

While engineers are looking after the hardware, foresters are developing a program to enhance the appearance of the rights-of-way.

*Four different utilities . . . four types of advanced tower design. From left is line erected by Pacific Gas and Electric, Ontario Hydro's extra-high-voltage line from the James Bay area, high-voltage DC line being built by Atomic Energy of Canada Limited for Manitoba Hydro and wooden towers of Southern California Edison.*





With an acute shortage of park and recreational areas in the larger Ontario centres, much thought is being given to how municipal parks and recreation departments could utilize rights-of-way. For instance, is it practical to build bicycle or walking trails or open rights-of-way to ski-dooers in winter? The planting of shrubs and trees could make these areas far more attractive.

Several US utilities have already opened their rights-of-way to the public. Indeed, improvements to existing rights-of-way have even helped utilities when they needed to acquire property to extend their transmission network.

Forester Earl Gillespie is excited about the challenge. Instead of cutting down all the trees on rights-of-way, he can now bring to bear his knowledge of forestry to preserve those that do not interfere

with the transmission lines.

"Our department will make recommendations as to which of several proposed rights-of-way is the best from the point of view of the topography. We'll take into account the improvements which can be made to the right-of-way to reduce the impact of our lines and structures on the surrounding area," he says.

"Once the route is chosen, we'll use existing trees to the best advantage, decide what grass should be sown and make recommendations as to the possible uses to which the right-of-way may be put. There will be a clean-up phase after towers and lines have been erected including grading and seeding work. Trees may be planted as a screen or other work undertaken to make the right-of-way more acceptable to the public."

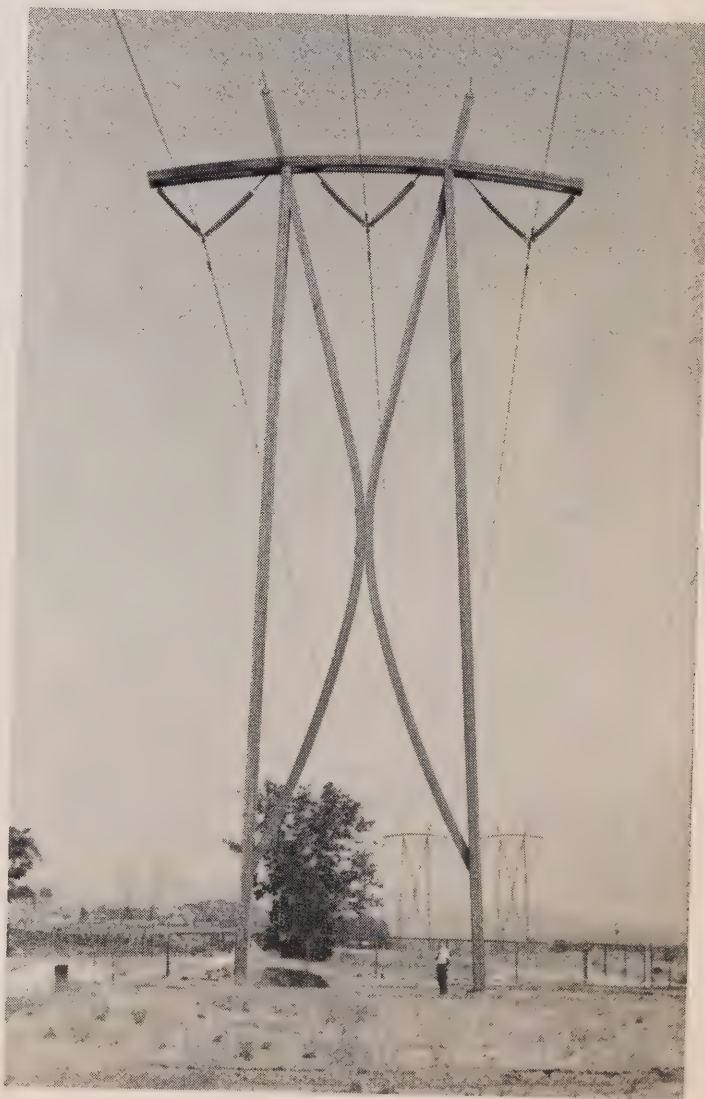
One of the most interesting facets of this

program is being undertaken with the Ontario Department of Lands and Forests to find a suitable cover or smother crop for use on rights-of-way. One hundred and eighty sample plantings have been made and it is hoped to develop a combination of grasses that will grow quickly on bush-cleared areas under various topographic conditions, retard unwanted growth and, more importantly, supply seeds and cover for wildlife that comes to the right-of-way in search of food.

"A good smother crop, if it can help retard weed growth, would also cut down the amount of spraying required to keep rights-of-way weed-free," says Mr. Gillespie.

One of the forestry department's first challenges will be the improvement of a new five-mile transmission line to replace an old line in London, Ontario.

The towers to be erected on this stretch





will also be different. "It may be difficult to come up with a revolutionary design accepted by everybody, because tastes differ," says Peter Ralston, supervising design engineer in the transmission and distribution department.

Among other suggestions Hydro is examining is the practicality of multi-utility corridors, or utilidors.

"In the more highly-populated urban areas we are considering co-ordinating highways, rapid transit, water and oil pipelines and telecommunications with our rights-of-way," says Milan Nastich, director of property. Mr. Nastich believes every effort should be made to make rights-of-way more appealing, particularly in rural and suburban areas where appearance is of prime importance.

But the introduction of utilidors raises several objections. Although, in some cases, utilities could easily use the same area over short distances, long-range planning would present a problem. The other major objection is one of safety. An exploding gas line might black out a whole community.

Another suggestion is to bury high-voltage lines. "Underground high-voltage transmission is an expensive undertaking," says Neil McMurtrie, senior transmission design engineer. "Present technology has not come up with an economic approach. Underground high-voltage lines have been installed in some cities, but only for short distances. And if there's a break, it may take three weeks to locate and repair."

Ontario Hydro is seeking practical solutions. Research is oriented toward increasing the power load that overhead lines can carry

and developing and testing materials for improved insulation. This will reduce the amount of land required for rights-of-way.

At a testing establishment now being set up at Kleinberg, engineers will have equipment for testing materials at 1,000,000 volts and more. A pilot line will be used as a test bed for new insulation materials as they are developed. Transmission lines of the future may eventually be part plastic if fiberglass-reinforced insulation systems now being tested in the United States and Britain meet requirements.

Innovations will not be introduced overnight, however. As Mr. Cassan points out, transmission line technology has a lot of catching up to do. But chances are the seventies will mark the beginning of a radical change in the landscape. □

*Unusual transformer station near Los Angeles demonstrates the way in which utilities are looking to new design to lessen the impact on the environment.*





# Commissioners' most important task

## District 1

most important task facing municipal electric commissioners in every corner of the province today is to convince leaders in rural communities of the value and the need for continuing the commission function in electrical distribution, says OMEA secretary-manager E. C. Nokes.

Speaking to delegates at the District 1 convention in Ottawa, Mr. Nokes said that the submission of the association's regional government policy proposal to Municipal Affairs Minister Darcy McKeough, "it seems obvious we have at last won the ear of the minister."

He added, "some commissioners tend to turn away from the association when they feel threatened locally, when they're unable to generate the support of the local A, or when they feel their local desires are not protected by association policy."

Pointing out there was a division within the ranks during the OMEA's 1968 regional

government study, he said the OMEA's Government Legislation Committee prepared and submitted a policy proposal to the directors, which was accepted and approved. But when the committee began to prepare the proposal for submission to the membership an emergent situation arose. The executive was told that a statement on a policy for electrical distribution, detrimental to the concepts supported by the OMEA, was likely to be stated publicly.

Mr. Nokes added that at the 1969 annual meeting at least one group was persuaded to make its own representations to the minister.

"District action in another area resulted in the minister receiving additional briefs from sections or splinters of the association. The minister and his advisers are well aware of this fragmentation," Mr. Nokes said.

He added that in March, a policy proposal, while not meeting everyone's idea of a

perfect solution, was approved by the annual meeting.

Mr. Nokes said the OMEA's regional government policy is a sound one with considerable elasticity. Within its framework a satisfactory arrangement for electrical distribution should be possible in any region in the province.

"That policy states it is imperative that local distribution systems be operated under a commission form of administration capable of adapting itself to contemporary conditions and these commissions should be elected rather than appointed.

"While no one quarrels with anyone's right to go to the minister with his own views, surely if he sees a solidarity of viewpoints and purpose from Hydro commissions, he is more likely to accept our position. And we can easily picture the reverse happening if he continues to receive presentations from splinter groups," Mr. Nokes said. □



## Lennox power

Lennox generating station, under construction at Bath, 20 miles west of Kingston, will produce more power than all the 21 plants now operating in Eastern Ontario, George Gathercole, Ontario Hydro Chairman, told delegates.

Mr. Gathercole said Hydro's first oil-fired generating station will feed 2,300,000 kilowatts into the provincial power network upon completion.

"That's two-and-a-half times Ontario's share of the St. Lawrence development and more than enough power to meet twice the present demands of cities the size of Ottawa, Kingston, Belleville and Hamilton combined," Mr. Gathercole added.

He said the decision to use oil at Lennox followed an exhaustive study by Hydro engineers and confirmation by a major engineering consulting firm. The firm's findings revealed that the economic advantages of oil over coal at the Lennox site would be even greater than originally estimated. □

## call to end 'discrimination'

The OMEA's Government Legislation Committee will be asked to petition the Ontario government for re-establishment of grants-in-aid for Southern Ontario utilities acquiring rural distribution systems.

Delegates gave overwhelming approval to a Nepean Hydro proposal calling for "an end to the discrimination against Southern Ontario municipalities."

Nepean Hydro delegate H. R. McDonald said large cities growing into rural municipalities are being forced to absorb unprofitable rural customers and are finding it necessary to issue debentures to take over the systems.

He said grants-in-aid were discontinued in Southern Ontario in 1958 when they were "moved north of an imaginary line and the funds allotted were used to help in the formation of the Thunder Bay regional Hydro system."

He added: "We can see no difference in Thunder Bay and Ottawa-Carleton. There are 16 municipalities within this region, of which only three are urban. We have to

find some way of paying Ontario Hydro between \$4 and \$5 million for the plant to service these rural customers — and we have no grants-in-aid to assist in raising these funds.

"This resolution," Mr. McDonald said, "is directed toward the Ontario government and not Ontario Hydro. It's a request to the government to discontinue the discrimination against Southern Ontario municipalities."

Delegates defeated a second resolution calling for the AMEU to implement a series of intensive conversational French courses for Eastern Ontario utility employees.

Gloucester Hydro delegate R. A. Bisaille said the OMEA should be taking into consideration the federal and provincial government policies on bilingualism and establish French courses for utility employees and commissioners "to make everyone of us a better Canadian."

He said funds for the establishment of French courses are available through the Department of Education and that his utility found it impossible to find bilingual staff.

Delegates turned down the proposal by a narrow margin. □

*Newly-elected executive of District 1 includes (back row), L. H. Bracken, Brockville; E. H. Hare, Kingston; Earl Kennedy, Lindsay, and F. R. Cross, Nepean, second vice-president. Seated, A. J. Bowker, Gloucester, first vice-president; W. Ansell Taylor, Peterborough, president, and W. L. Andrews, Cobourg, past president.*





## end of status quo

The OMEA accepts the fact of regional government, but is ready to take on all powers in the interest of maintaining reliable electric service to the people of Ontario, says association president D. G. Hugill.

Mr. Hugill said that as the voice of the municipal utilities, the OMEA has two main concerns: preservation of the commission concept, and preservation of municipal ownership of Hydro facilities.

Sixty years ago, in the Kitchener-Waterloo area of Southwestern Ontario, municipal hydro was born. The fledgling of 1910 has since spread to all corners of this province and the opportunity and the electric commissioner of today must see to it that there is no erosion or dilution of the total municipal involvement in Hydro," Mr. Hugill said.

He added that at the same time, municipal utilities must maintain their partnership with Ontario Hydro and continue to work together to meet the electrical needs of tomorrow.

"For the short term, then, it's safe to say the status quo won't be maintained and some changes will take place.

"But what about the long term? Is it possible we may see Ontario Hydro become only the wholesaler of electrical energy with all the retailing done through the municipalities? Or is the Hydro-Quebec concept the ultimate goal of change?" Mr. Hugill asked.

While admitting both were extreme possibilities, he said that as a municipal commissioner he'd go for the first alternative if he were forced to choose between them.

"However," Mr. Hugill said, "I see no reason for a change to either of these extremes since the present efficient operation of 60 years' duration can be adapted to work just as efficiently under the new regional set-up as it has for the past six decades." □

## status report on muskoka

The question of how electrical distribution will be handled under regional government in Muskoka has still to be resolved, Ontario Hydro's First Vice-Chairman R. J. Boyer, MPP Muskoka, told delegates to the Georgian Bay Municipal Electric Association's annual meeting at the Elgin House.

One of a panel of three, Mr. Boyer discarded his prepared text in favor of an informal report on the status of municipal government changes. Other panelists were OMEA President D. G. Hugill and Barrie's Mayor L. E. Cooke.

Mr. Boyer said the new Muskoka District Council will study the alternatives for electrical service over the next year, but pointed out that, except for three existing municipalities with their own commissions, most of the district is served by Ontario Hydro's rural system.

He told delegates that the 25 municipalities in Muskoka would become six next year and the district council would be formed by the six mayors and councillors from each community. Huntsville's former mayor, M. A. Tibbett, has been appointed district council chairman for the next four years, after which a chairman will be elected from among the councillors as in Metro Toronto, Mr. Boyer said.

Mr. Hugill issued a plea for unity within the OMEA, calling on districts to proudly display the district number and "OMEA" on their stationery.

He said it's "quite noticeable that four of the nine OMEA districts have a distinctive name identifying themselves with the region." However, he added, any organization is only as strong as its heart. "Arms waving in apparently autonomous directions have a tendency to indicate to government or the OMEA's critics that the parent association has a forked tongue.

"It's just not so. The OMEA speaks for all districts, not as districts but as one strong association. We're representatives of Hydro commissioners all over the province, therefore it's imperative that all districts identify themselves with the provincial association," Mr. Hugill said.

And Mayor Cooke suggested that local government reform is the need of the hour.



Hydro Chairman George Gathercole and Ottawa Hydro representatives view model of the Lennox oil-fired generating station. Mr. Gathercole (second from left) are general manager. Askwith and commissioners A. E. L. Campbell and L. L. Coulter.



# district 2

While he admitted he's "not a proponent of regional government, I realize it's something that's here and we must stop using such terms as junior and senior governments.

"We're partners in the government of this province, therefore there's a need for the restructuring of local government. There are many prejudices created by the term regional government, but it's really only an extension of the powers of local government," Mr. Cooke said.

He added that there's already a regionalization of almost every public service now provided such as education and hospitals. And he ended with a word of caution to Hydro commissioners — that they continue to promote the use of their product for their survival. "Municipal councils cannot promote the use of any energy form," Mr. Cooke said.

In a later session, Mr. Tibbett told delegates that the Muskoka area had not been moving over the years and regionalization was the only way to get it going again.

He said there are many serious problems in Muskoka including pollution and land use. He said the six municipalities that will be formed will continue to have a good deal of independence but, like Mr. Boyer, he was unable to say at present what would become of the local Hydro commissions.

Waterworks, he said, would be absorbed by the district, but the distribution of electrical energy "is anyone's guess at the moment."

And from the audience W. Sam Jennings, president of OMEA District 5, questioned the wisdom of even setting up a regional government "when you look at the turmoil we have in Niagara Region.

"I'm not just referring to electrical distribution, but the whole structure of the regionalization of our area. I'm not so sure it's working," he said. □

## promote to beat inflation

Stan Taylor was ready to take on all comers during a panel discussion as he defended the reasons for an intensified marketing campaign for electrical utilities.

Mr. Taylor is Ontario Hydro's Georgian Bay Region consumer service and sales engineer, and he levelled a broadside at the critics of marketing policies.

"We've a damn good product, the best, most versatile source of energy yet devised and as a public enterprise we've a responsibility to make that product available in order to offer the people of this province a choice between electricity and other forms of energy.

"By selling more energy, Ontario Hydro and the local utilities are, in fact, beating inflation. With increased sales, the local cost per kilowatt-hour is not increasing as fast as capital costs. And we must promote to keep unit costs down," he said.

Of the proponents of the zero-growth theory, he said: "Surely they're just a splinter group formed to express an opposite view to growth at any cost — to hell with price.

"One way of stifling growth in Ontario would be to stop building generating stations. Sure, that's no problem this afternoon, but tomorrow it could mean brown outs, the next day blackouts — and who knows what after that."

To the proponents of "the more you promote, the more you pollute" theory, said "balderdash."

Mr. Taylor suggested that a million homes using fossil fuel as a heating source with a million chimneys belching smoke at rooftop level would create a pollution problem that staggered the imagination.

"But you take that same million houses electrically-heated from one central plant with a single stack equipped with the latest electrostatic precipitation equipment and the pollution level is minimal. We're a socially responsible organization incorporating the neatest arrangements possible for the transmission of our product, and there are no leaks, no explosions and no spillage from our distribution system," he added.

During a question period, panel moderator E. R. Alexander, Barrie PUC chairman, referred to the switch to natural gas as a fact and asked why Ontario Hydro continues to promote when it has to use a competitor's energy to meet demands.



*District 2 president W. R. Tomlinson, of Port Elgin, is seen with the new executive at the close of the annual meeting at the Elgin House. In the back row: D. A. Watt, Orangeville; C. J. Lawson, Walkerton; H. J. Cameron, Kincardine, and W. G. Boyes, Alliston. Seated: W. E. Theaker, Paisley, first vice-president; H. J. Murphy, Barrie, secretary-treasurer, and E. R. Alexander, Barrie, second vice-president.*



Grant Bainbridge, Hydro's director of consumer service, explained the partial conversion of the R. L. Hearn generating station to natural gas-firing was an example of Ontario Hydro's concern for pollution control. He added that low sulphur content coal is in short supply, therefore it was decided to convert four of the plant's smaller units to gas. □

## price-fixing charged

Charge of price-fixing was levelled at the electrical manufacturing industry by R. Tomlinson, Georgian Bay Municipal Electric Association president and chairman of Port Elgin Hydro. He told delegates that orders from two manufacturers for a transformer needed by his utility "were identical in every detail."

"It's a pure case of price-fixing by the electrical equipment manufacturers and there's nothing an individual can do about it," he said.

Tomlinson said he wrote to the government and complained about the identical orders, but was told that nothing could be done. He urged delegates to unite and speak as a group "so that we can do something about situations such as this."

"No longer can we go on the same old way as we've been doing for the last 25 years. We need changes in our organization if we're to accomplish what the Ontario Municipal Electric Association has set out to do. We must be in a position to influence government and only by speaking with a united voice can we ever hope to accomplish anything," Mr. Tomlinson said. □

## happy? no, he says

Everyone seemed happy at the Georgian Bay Municipal Electric Association's annual convention.

But there was one man who wasn't. E. R. Alexander of Barrie, chairman of the District 2 resolutions committee, was "somewhat disgusted."

As he presented his annual report, he introduced himself as chairman of the "do-nothing" committee. "We have no resolutions. Looks like everyone's happy with everything — Ontario Hydro, regional government, the parent association. Nonsense," he said.

He proposed the tenure of office of the district president be limited to one year and that the president be authorized to form a committee to study the district's relationship with the provincial association. "There's something definitely wrong with our relationship," he said.

Both his proposals were accepted. □

## little respect for news media

Public utilities commissions tend to have little respect for the news media, delegates to an OMEA District 6 convention in Kitchener were told.

Barry Pauley, news director at radio station CHYM, Kitchener, member of a panel discussing public relations for municipal utilities, said one of the first places people call in the event of a power outage is the local radio station.

"People get up in the morning, turn on their transistor radios, then find they're unable to brew their coffee. The first place they call is the radio station and more often than not the people at the station are unable to tell them why there's no power," Mr. Pauley said.

He called on utilities to keep the media posted on planned or any other interruptions "in order that we, too, can do our job."

And Wayne MacDonald, the Kitchener-Waterloo Record's photo editor, claimed the lack of information from PUCs tends to create the image of a private company rather than an elected public body.



*There's something of interest for everyone on the District 6 program. President Archie McGugan, centre, points out highlights of the meeting to first vice-president D. R. Larkworthy, left, and second vice-president J. M. Lind.*



He called for more free and open discussion at commission meetings, charging the lack of it suggests the PUC is nothing more than a rubber stamp operation. Mr. MacDonald said the public must be given the opportunity to learn that the commission is working for its benefit and only through free and open discussion at meetings attended by representatives of the media is this to be accomplished.

Former newspaperman Ray Stanton, who now operates a public relations consultant service, suggested that a lot of public bodies are not committed to keeping the people informed, but that the local public utilities commission isn't one of them.

He said many critics of the Hydro in Ontario enterprise have suggested that local commissions should be abolished and their responsibilities handed over to a committee of council.

"And there's not been much of a public outcry in support of the PUCs because of the lack of communication on the part of the utilities," Mr. Stanton said.

Other seminars continuing at the same time explored supplementary pensions for municipal employees and data processing for small utilities. □

## another compec

COMPEC (Co-operative Marketing Plan for Electrical Utilities) may come to Huron County, John Lind, chairman of the OMEA District 6 load building committee, told delegates.

Mr. Lind said that "considerable investigation has taken place over the past year to determine the feasibility of following the Essex County example in setting up a utilities marketing co-operative with assistance from Ontario Hydro."

He said that as a result of these investigations, it has been recommended that a COMPEC group be formed in Huron County. Feasibility studies, he said, have revealed that COMPEC could be inaugurated in the area at a cost of \$2 for each utility customer. □

*The men who will guide the affairs of District 6 for the coming year include, back row, W. S. Smith, Fergus; G. Shepherd, Elora; G. D. Sills, past president, Seaforth, and J. McMichael, Listowel. Middle, G. Filsinger, Goderich; A. T. Brown, Galt; C. Lipphardt, Harriston; L. P. Breithaupt, Kitchener, and C. C. Smith, Guelph. Seated, D. R. Larkworthy, Stratford, first vice-president; Archie McGugan, Palmerston, president, and J. M. Lind, St. Marys, second vice-president.*





# along hydro lines

## Bruce gathers momentum

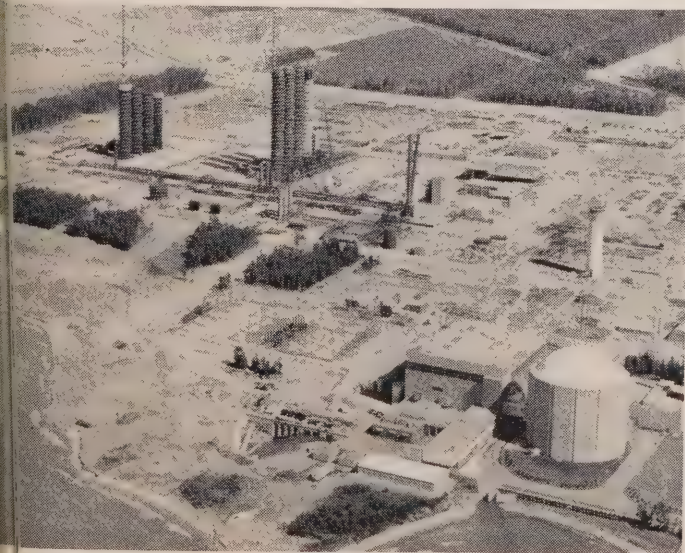
Preparatory work for one of Ontario's biggest construction projects gathers momentum at the Lake Huron site of Bruce generating station. Camp buildings now being erected will act as temporary quarters during the years required to build the 2,000,000-kilowatt nuclear power plant.

Among the structures completed or nearing completion are the carpenter shop, washrooms, lunchrooms, compressor house and construction headquarters. Quarters for those construction workers who will not be living in neighboring communities are already being occupied.

Paved roads on the site will link Bruce with the existing Douglas Point generating station and with roads leading to Highway 21. Offshore geological investigation work is completed for the water intakes. Rock excavation and site grading work is continuing in some areas.

The new power plant is located at the north end of the Bruce Nuclear Power Development, a joint project of Ontario Hydro and Atomic Energy of Canada Limited. This complex, one of the largest on the continent, will comprise, when completed in the 1970s, several major components.

In addition to the Bruce station, there will be a plant for the production of heavy water and an associated steam-production plant. These three all are under construction with varying completion dates. Douglas Point nuclear station, which has been operating since 1967, is also a part of the complex.



in shape

## Steam plant

The Bruce auxiliary steam plant will have a capacity of 2½ million pounds an hour. It will be operated by Ontario Hydro.

The plant, together with Douglas Point, will provide steam for heavy water production and ensure continuous operation of the heavy water plant.

Structural steelwork for the steam plant is now up and metal cladding for the walls is nearing completion. A 330-foot stack for the oil-fired station is virtually completed and the building will be closed-in during the winter. Montreal Engineering Co. is handling the construction for AECL.

Equipment for the \$20 million plant will be installed next spring and summer and the commissioning of the components started in the fall of 1971.

Imperial Oil Limited has contracted for a unit train to carry heavy residual fuel oil twice a week to the steam plant from its Montreal refinery. An 11½-mile spur line is being built from Port Elgin to the Bruce site. □

## Interim rates up

An increase in interim wholesale rates to municipal utilities and 88 large industrial customers served directly by Ontario Hydro has been announced by Chairman George Gathercole.

Mr. Gathercole said the increase to municipal commissions will average 7 per cent for 1971 while rates charged to direct industrial customers will be increased by 8 per cent. The new rates come into effect on January 1.

"Although this will increase the cost of power to municipal Hydro commissions, it does not mean immediately and automatically that consumers will pay higher rates," Mr. Gathercole said. "Some of the municipal Hydro commissions will be able to absorb all or a portion of the increase under their existing rate structures," he added. "Others will be forced to pass it along. In the long run, these higher costs will affect municipal rate structures."

Mr. Gathercole pointed out that Ontario Hydro, like every other utility in North America, is experiencing a strong upward thrust in operating costs, which must be passed along to its customers.

"As large as the increases appear, they compare very favorably with those of other Canadian and US utilities.

"In the last year, Canadian Utilities, in Alberta, increased rates 15 per cent, Hydro-Quebec increased its rates by 10 per cent and British Columbia Hydro by 13 to 15 per cent. Manitoba Hydro may be forced to increase its rates by 14.5 per cent. In the US, the Tennessee Valley Authority raised rates 23 per cent, and Consolidated Edison, which serves New York City, increased rates by 16 per cent. Most other electrical utilities have been forced to raise their rates by 10 to 25 per cent," Mr. Gathercole added.

He said costs continue to escalate for equipment and supplies, wages and salaries, fuel and interest rates. "But if the province is to expand, Hydro itself must expand and new plants are being financed at interest rates that are nearly double those of a few years ago." □

## System building

With system building as the theme for its industry conference and trade show on February 8 and 9, the Ontario Electrical League is setting the stage for a comprehensive look by people from all facets of the industry at the electrical opportunities within the mobile home market and modular or factory-built concept for commercial and residential construction.

OEL is taking this approach to keep the electrical industry abreast of changing building techniques and the problems and challenges it will face through improved construction methods.



In conjunction with its conference, OEL will host the National Electrical Week dinner and is arranging for it to be held at the Ontario Science Centre on February 8.

The theme of National Electrical Week is "Electricity is for People," and will focus on electricity's role as a servant of mankind. □

## Henry F. Baldwin

Henry F. Baldwin, last year's president of the Ontario Municipal Electric Association and a man who devoted a quarter-century of his lifetime to Hydro, has died at the age of 72.

Despite his illness, Mr. Baldwin remained a member of the Oshawa PUC until the time of his death. He was a man whose devotion to duty wouldn't allow him to step down.

A son of the late Mr. and Mrs. Thomas H. Baldwin, he was born and grew up in Lindsay. He moved to Oshawa in 1918 after service in the Royal Flying Corps and was employed in the parts department at General Motors for 44 years. At the time of his retirement in 1963, he was superintendent of the parts warehouse.

Always intensely interested in the work of the local utilities, Mr. Baldwin was first elected to the PUC in 1945 and served continuously to the time of his death. He was commission chairman on several occasions.

In tribute to Mr. Baldwin, The Oshawa Times said that it was during his tenure of office that Oshawa PUC enjoyed its greatest period of expansion in both its electric and water departments. It was during this period also that the commission took over the operation of the city's bus service from the Canadian National Transportation Co., a subsidiary of Canadian National Railways.

Always seeking to improve the calibre of service provided by the utility, Mr. Baldwin closely associated himself with the work of the OMEA, the Ontario Electrical League and the Ontario Municipal Water Association.

Despite his difficulty in getting around, Mr. Baldwin made an appearance at the last OMEA-AMEU convention, "just to let my fellow commissioners know they're still in my thoughts." □

## Records shattered

More than 100,000 visitors have toured Ontario Hydro's Robert H. Saunders-St. Lawrence generating station at Cornwall since the first of the year.

This number exceeds all other years, including 1967 when thousands dropped in on the way to Expo to see how power is produced from the St. Lawrence.

Until its Labor Day closing, 38,500 people visited the information centre at Hydro's Nanticoke generating station, a coal-burning thermal-electric plant under construction on the Lake Erie shoreline, eight miles east of Port Dover. Last year, the site had 2,321 visitors during the same period. □

## Air power

From the time that utilities first began building huge power plants, they've pondered the problem of how to store power during off-peak hours and release it during periods of peak demand.

To date there's been just one way — pumped storage plants — that use off-peak power to pump water into a reservoir for release when the demand is high. But now engineers in several European countries are pushing ahead with another system, one that runs on compressed air.

During off-peak hours, these plants would employ gas turbine generators to compress air and drive it into underground caverns.

During the day, the air would be released back through turbine blades to drive electric generators.

The system is getting its biggest boost in Sweden, where a gas turbine manufacturer already has detailed plans for such a system. For the past two years, the company's efforts have been supported by the Swedish State Power Board. Interest is also lively in Finland, Denmark, Yugoslavia and France. Electricité de France has made extensive studies of the system and found it less costly than hydro-electric pumped storage systems.

While it's possible to pump compressed air into almost any underground cavity, abandoned mines, particularly salt mines, are ideal. One problem, though, is that many abandoned mines have empty gas and oil deposits are simply too big. Another is that it's difficult to keep pressure high enough for the compressed air to have sufficient force.

To overcome the problem, engineers have devised a scheme using a column of water and a reservoir. A long funnel connects the ground-level reservoir to the underground cavity. As compressed air is introduced into the cavern, it applies pressure on the water on the cavern floor. The water has only one place to go — up the funnel, raising the level of the reservoir a few feet. As the air is released, the reservoir sinks back to its original level.

## municipal briefs

OMEA president D. G. Hugill was particularly happy to attend the District 1 annual meeting. The gathering marked his first visit to the nation's capital and afforded him an opportunity to have a "brief chat with the man whom I consider one of the great Canadians of all time — John G. Diefenbaker." Mr. Hugill took a stroll from the Chateau Laurier to Parliament Hill where he called on Mr. Diefenbaker in his office.

Trenton PUC added a footnote to the minutes of its last meeting on instructions from chairman F. J. Barry. It was a tribute to commissioner C. A. Baker, who was presented with a 15-year-long-service award at the District 1 OMEA meeting in Ottawa. The tribute said in part, "... he was honored by his fellow commissioners for his 15 years' service, not only to Trenton but to the Eastern Ontario region. Let the record stand for all who follow as a goal to be attained. ..."

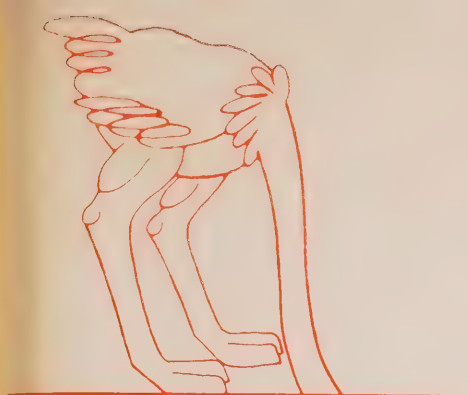
Trenton PUC is switching to computer billing, which will be done at the city's Loyalist's College. Commissioners have considered a switch to computerized billing for two years, but ruled out the possibility of acquiring their own unit. The college computer will handle 60 bills a minute.

Tribute was paid to Renfrew Hydro line crew at the District OMEA meeting in Ottawa for the successful rescue of a young woman found floating face down in the Bonnechere River. Manager G. R. Young accepted an Electrical Utilities Safety Association plaque on behalf of the crews from EUSA president William Hogg. Certificates of merit were presented to each crew member "for their spontaneous action."

You never know what's in a day's work for a lineman. Like Owen Sound, just recently, when a crew was called to rescue a seagull. It appears the gull tangled with a fishing line and the line tangled with the PUC's distribution wires. Crews were dispatched to unwind the bird, which chirped a cheery farewell and went back to its fishing.

OMEA delegates meeting in Zurich stood in silent tribute a month to the late Ian F. McRae and Henry F. Baldwin. Mr. McRae was Ontario Hydro's second vice-chairman and Mr. Baldwin was last year's president of the OMEA.





## as don wright sees it

Money is funny. For one thing, the intensity of the pain associated with its departure appears to bear little or no relationship to the value received in the exchange.

Who hasn't heard the heedless cry "next round's on me, boys," issued without agony and even with enthusiasm down at the local health bar as the crowd gathers after work for yogurt and prune juice? It's grins all around as the waiter returns with the joy juice and the pitiful remains of a \$10 bill. And who hasn't blown the price of a week's groceries for a one-shot sit-in at a dining room featuring violins with the vegetables?

The same kind of lettuce will still buy a month's supply of electricity — but that's different. Who needs something you can't even see when all it can do is take the place of half-a-dozen servants and keep you warm, clean and entertained in its spare time? Things are already so bad in the United States that the average American now spends almost as much of his income on electricity (1.4 per cent) as he does for such things as alcohol (2.7 per cent) and cigarettes (1.7 per cent).

Incidentally, any American brave or foolish enough to persist with the cigarette habit after November 1 does so in the face of a pretty blunt warning. After that date, every package of cigarettes manufactured for sale in the United States must carry the following message: "Warning: the surgeon general has determined that cigarette smoking is dangerous to your health."

Kilowatt-hours, on the other hand, get a clean bill of health and it won't be the end of the world even if we should eventually end up paying more for electricity than we do on smoke.

Meaningful as it may be to the people involved, inter-departmental communications can look a bit peculiar to the outsider. As a case in point, we might refer to the succinct Daily Summary of Incidents of Major Importance issued by Hydro's Operations Division. One item, dated October 28, states: "Pelee Island (partial) 5.15, 35-minute interruption. Cause: 1.5 mw of customer load was interrupted to transfer part of the load to diesels for the hunting season."

Behind this item is the whole colorful saga of the Pelee Island pheasant hunt. For a few days each year, hunters and their dogs from a dozen states and across the province descend by the hundreds on the 10,000-acre island for the hooting. Considering that only about 80 families live on the island, located in Lake Erie and the

most southerly part of Canada, the effect of the annual hunter invasion on the power load can be appreciated. That's why diesels are required to supplement the regular electrical supply, which is carried by underwater cable.

■ Harking back to the Summary of Incidents, October 7, we see that McVittie G1 was forced out of service at 17.27 hours, "displaying signs of hot thrust and unusual vibrations."

No comment — except to wish McVittie a speedy recovery.

■ Anyone who imagines that lightning is little more than a minor nuisance to the men who maintain the transmission line systems should glance through these reports. During the thunderstorm season, item after item pinpoints expensive and sometimes extensive outages caused by these static discharges.

Too bad these two forms of electricity can't get along more amicably, but perhaps it's to be expected. They were delivering the high-voltage celestial variety long before Sir Adam made the scene and a bit of petulance on the part of the original power producer is understandable.

Grandstanding is something else. Not long ago, the Eddy Match Company plant at Pembroke was temporarily put out of business by a bolt of lightning. Company officials put it down to a flamboyant attempt by someone on high to strike a light. More recently, a group of French and West German tourists were stripped stark naked by a freak bolt of lightning in Italy. There were no injuries.

Sorry about that zap, chaps, but some of those outfits really were atrocious.

■ Speaking of lightning storms, we've come across a magazine account of a 19th century pyrotechnic display guaranteed to turn every deceased electrical inspector over in his grave.

Describing the life and idiosyncrasies of Robert Arthur Talbot Gascoyne-Cecil, third Marquis of Salisbury and one-time Prime Minister of Britain, the account deals at some length with the electrical goings-on at Hatfield House, the family residence, before the turn of the century. It seems that electric arc lights were used at Hatfield several years before the incandescent lamp had been invented, but the wiring didn't exactly conform to modern standards.

"Why Hatfield House did not burn to the ground is one of the minor mysteries of early domestic electricity," says the report. "Miniature storms of lightning sometimes raged in the drawing room, which was often thrown into darkness, and the wires on the ceiling of the great gallery were apt to break into flames."

The family grew so accustomed to these electrical spectacles that they "nonchalantly threw up cushions to put the fires out and then went on with their conversation."

■ In a day when the brickbat is tossed more frequently than the bouquet at Hydro, every constructive suggestion is welcomed. The following sincere offer of assistance, proffered by a citizen of British Columbia, has been duly acknowledged.

"Dear Sir:

I have read about a problem of yours on page 14 of the 15 August issue of Toronto Star Weekly/Canadian Panorama about the public reaction to your proposed transmission line, Pickering to Nanticoke. Most people seem to be objecting to the eyesore aspect of these 140-ft. towers in a

part of Ontario which I remember as being truly scenic.

Well, I have an idea for you that may allow your towers to occupy this scenic country without despoiling it.

Why not camouflage-paint the things, so that they blend right into the scenery on a bright sunny day? Each tower would have to be individually painted for its particular location, but this wouldn't be too hard with a good crew and a mobile spray outfit, as long as the metal was properly primed at the factory.

Believe me, I know what I am talking about. I had a job in the Army dealing with such artistic considerations as camouflage, and I still use camouflage in my present trade as a sign painter. For instance: I put up a lovely big commercial sign beside the highway out here and it looks swell, but it would look like Hell if I didn't spend a bit of time dabbling on camouflage colors and patterns to match the locale. I'm getting pretty good at it. In fact, I once had a camouflaged truck which I parked in the bush and couldn't find again. It's still there. I have another camouflaged truck now, but I carefully tie a string to the door-handle so I can find it again.

Though I might sound like a funny guy, I think I could help you camouflage these towers and cables so that your only problem would be to keep aircraft pilots from hanging themselves in them

Yours cordially"

As a matter of fact, Hydro tried this technique some time ago, but had to stop due to maintenance problems. Linemen had trouble finding the towers and several of these structures are still at large somewhere in the countryside. As a last resort, camouflaged crews joined the search and these boys may have been successful. Neither towers nor the linemen have been seen since, but strange reports drift in from time to time about strong language emanating from on high in certain locations — particularly when labor negotiations are at a critical stage.

■ The hunting season is with us again, but it's too early for us to award our annual tip-of-the-hat for bone-headedness in the face of the enemy — in this case, society.

Instead, we'll hark back to last year's award winner just to re-establish how difficult it will be to win a prize for asininity. The retiring champion was apprehended near Brampton, but only after he had succeeded, with the help of his trusty rifle, in doing more than \$17,000 damage to a Hydro transformer. He had apparently mistaken the multi-tonned monster for a rabbit.

■ Or perhaps it was the Bunny Man. Residents of a Washington suburb have been startled recently by the antics of a hatchet-wielding fellow dressed in a bunny rabbit suit who seems to have it in for trespassers in general. On one occasion, he threw a hatchet through the closed window of a parked car and on another was interrupted hacking away at the porch of a new house. In both instances he hopped away unmolested to his own briar patch.

Perhaps we spoke a bit too soon last month in suggesting that England was the sole reliable source of odd-ball news items. Hopefully, America is staging a comeback. □



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of the citie of Nazareth, into Ju-  
 l, vnto the \* citie of Dauid, which is  
 led Bethlehem, (because he was of  
 house and linage of Dauid,)

To be tared with Mary his ef-  
 used wife, being great with child.

And so it was, that while they  
 re there, the dayes were accomplis-  
 hat she should be deliuered.

And she brought forth her first  
 ne sonne, and wrapped him in swad-  
 clothes, and laid him in a manger,  
 cause there was no roome for them in  
 inne.

And there were in the same coun-  
 shepherds abiding in y field, keep-  
 watch ouer their flocke by night.

And loe, the Angel of the Lord  
 e vpon them, and the glory of the  
 ed shone round about them, and they

11 For vnto you is borne this day, in  
 the citie of Dauid, a Sauour, which is  
 Christ the Lord.

12 And this shall be a signe vnto you,  
 yee shall find the babe wrapped in swad-  
 ling clothes lying in a manger.

13 And suddenly there was with the  
 Angel a multitude of the heavenly  
 hoste praising God, and saying,

14 Glory to God in the highest, and  
 on earth peace, good wil towards men.

15 And it came to passe, as the An-  
 gels were gone away from them into  
 heauen, the shepherds said one to ano-  
 ther, Let vs now goe euen vnto Beth-  
 lehem, and see this thing which is come  
 to passe, which the Lord hath made  
 known vnto vs.

16 And they came with haste, and  
 found Mary and Ioseph, and the babe





**news**  
**december/70**



To all the readers of Ontario Hydro News, may I extend the Commission's best wishes for a Merry Christmas and a happy and prosperous New Year.

*George Gathercole*

Chairman, Ontario Hydro

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### the cover

The atmosphere of the season is admirably captured in this illustration reproduced by kind permission of The Canadian Save the Children Fund. The design appears on one of the fund's cards this Christmas and is the work of H. Detlev Voss, Ontario Hydro's art director.

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## Something of value

Conditioned as we are to the king-sized statistics being tossed about by governments and corporations, the figures released recently by Hydro in projecting its costs seven years into the future are something to think about.

In order to meet the demand for electricity and to provide a satisfactory margin of reserve, Hydro will have to double its capacity and spend some \$5.1 billion on capital expansion from now until the end of 1977. Interest expenses alone will amount to something like \$330 million in the year 1977.

Other factors exerting upward pressure on Hydro rates in addition to interest charges include the rising cost of fuels, materials, labor, depreciation, debt retirement and anti-pollution measures. Together, they figure to increase the wholesale cost of power by almost 50 per cent over the seven-year period.

If the projections are borne out, and assuming that the present cost trends of the municipal utilities continue with per customer use growing, then the cost of electricity to the average residential customer would rise from an estimated \$8.50 a month in 1970 to about \$11 a month in 1977.

This is a sizeable increase, but electricity will remain a bargain in terms of value received for the dollar. A month's supply of electricity would then cost about the same as a shirt, two bottles of liquor or dinner for two at a good restaurant. The comparison does not take into account the fact that these items are also likely to rise in cost. Per capita income in Ontario is expected to grow by up to 45 per cent over the seven years.

Electrical requirements will continue to represent only a small item on the family budget and one which will account for only a few minutes of the working day in terms of earnings. The average cost of electricity for a family works out around 30 cents a day at the present time.

It is a fact of life that the privileged position the people of Ontario have enjoyed over the years with regard to electrical rates is beginning to erode. The initial advantage was gained by a progressive and skilled development of economical river sites utilizing capital which was readily available at interest rates as low as two per cent and in a day when a skilled craftsman might make five dollars a day.

It is neither logical nor realistic to expect the same situation to prevail under the changing conditions. Even if these hydro-electric sites remained to be developed they would be infinitely more expensive today taking interest rates and other increases into consideration.

At the same time, customers have a right to expect Hydro to perform as efficiently in the future as it has in the past. They have a right to expect top service. Power must be available as required. Rates must continue to be competitive with those charged by the continent's most efficient utilities operating under comparable conditions.

For its part, Hydro has a right to expect its customers to recognize that it is playing a brand new ball game in a vastly different stadium.



# An Old-Fashioned Christmas

## NOT FOR ME

by Elizabeth Kimball

"And visions of sugar plums danced in their heads." A somewhat similar dream is entertained, this time of year, by fresh young brides and by grandmas, by swinging bachelors and by fathers of teenagers. Busy mothers, who feel they have done their families proud if they beat up a cake mix once a week, and hippie housewives whose shopping is ordinarily done at the health food stores, alike pore over cookbooks, and pen lists in which all accounts are massive.

Visions of sugar plums, indeed . . . and of 25-pound turkeys, fat ducklings, plum puddings, mince pies, cakes and cookies, marzipan and nuts and raisins . . . even, as the dream takes fire, of suckling pigs and boars' heads.

I will admit to indulging in the same sort of reverie. My mind roves back to when the children were small and I used to go all out in my festive preparations. "Ah," I sigh, "Christmas isn't what it used to be."

It's generally at this point that I pull myself up smartly. "And thank God it isn't," I say. For I have suddenly remembered the realities of Christmas-as-it-used-to-be. I

have recalled such catastrophes as Candles-in-Quagmire Pudding, and Christmas Cookie Chips; a feast at which infants became drunk; another at which not the board, but the diners, groaned. And I remember that most of these misadventures could be blamed upon antique equipment or upon ambitions out of touch with our times.

An old-fashioned Christmas, if the dream be pure, means cooking on old-fashioned stoves, by old-fashioned methods. And I have had more than enough of both of them.

As a January bride on Prince Edward Island, I prepared my first meal on a coal stove which must have been old before I was born. While I was familiar with coal and wood stoves (my early childhood was spent in big old Victorian houses), my practical experience had been limited to reading by their warmth, or roasting chestnuts and making fudge over them.

At Summerside, I not only had to get Black Beauty going, but first had to lug about eight scuttles of coal up from a mud-floored cellar. I dressed, rather winsomely, for this





*Everyone, from busy mothers to hippie housewives, pores over cookbooks and pens lists in which all accounts are massive.*

operation in my husband's duffle coat and hunting boots over my peach satin housecoat and embroidered mules. For the entrance to the cellar was from an open side porch.

Because what passed for coal in wartime was, apparently, black concrete, which when whacked sufficiently hard with a poker exuded liquid pitch, what heat it produced was neither extravagant nor easily regulated.

Even I cannot, under these circumstances, understand how I achieved the onion soufflé which I served my husband on that occasion. I recall, too, that I often breakfasted, at Summerside, on frozen bread (the stove supplied the only heat downstairs) and beef extract made from warm tap water.

Six times we moved, always on the east coast, during the first year of our marriage, and these perambulations acquainted me with some of the most ancient and infamous stoves outside a museum. I met, and came to terms with, stoves that were made of iron, tin, brick and porcelain — and a see-through model whose ancient tin

sides were so riddled with rust that, alight and in the dark, they appeared to be wearing spangles.

We had square stoves, oblong stoves, cylindrical (horizontal) stoves, and cylindrical (vertical) stoves. There was a squat little oblong stove with short chubby legs which resembled a dachshund; and an oval model with gracefully bulging sides and enormously long slender legs which reminded one, for all the world, of a giraffe poking his head through the ceiling. I was called upon, too, to cook upon heaters named Franklin or Quebec.

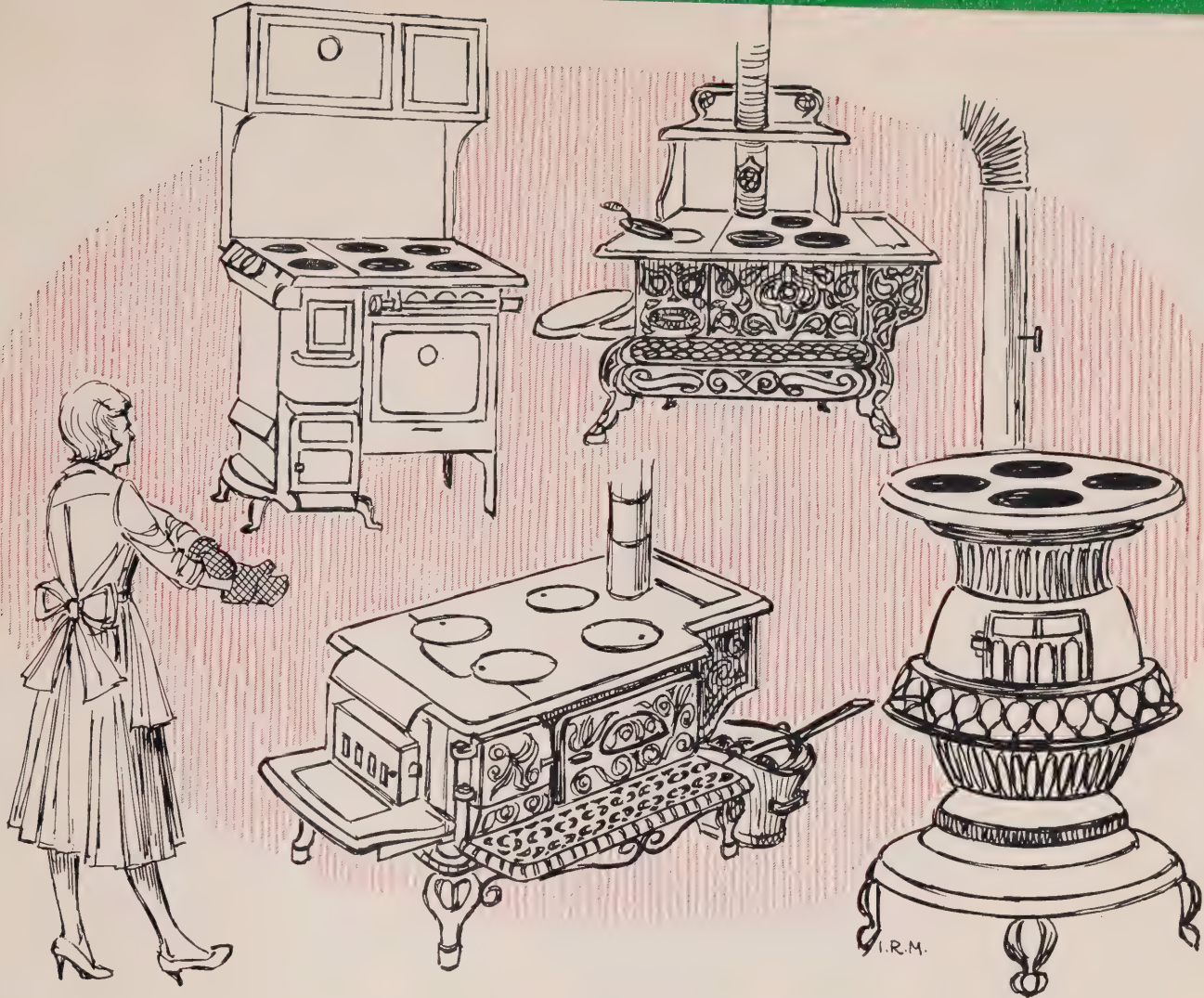
Since the peacetime citizenry had, for the most part, vacated these neighborhoods when the Air Force moved in, I had to educate myself in the management of these apparati. Few had thermometers and, if they did, they were misleading. I learned, with the aid of an ancient manual left in one cottage, to gauge the heat by toasting small cubes of bread in the oven. If the bread was still white at the end of 15 minutes, the oven was rated WARM. If, on the other hand, the cube was reduced to char at the end of five minutes, then it was

VERY HOT. This particular stove appeared not to have heard of MEDIUM, so I cooked most of our cooking on the top.

The FLOUR TEST, in which one substitutes a tablespoonful of flour for the bread, was also suggested by the same manual. But the smell of cooking flour led my husband and our guests to expect pie or cake, and took the edge off their appreciation of the offering of applesauce or Jello. The book also recommended that I test the oven by holding my hand inside. The human hand, of course, cooks more slowly than bread. Still, while one can throw away burned bread, a burned hand hampers completion of the meal. I stuck to the BREAD CUBE TEST.

These down-east stoves consumed wood, coal, coke and charcoal. In actual practice it was sometimes hard to recognize the substance. If, as I have indicated, coal was more often concrete-over-tar, coke was simply pulverized concrete rolled in glass. It tended to go poof! as soon as ignited and to die within 30 seconds. The little wood that was available in wartime fell into two categories — oversize asparagus (9)





*There was a squat little oblong stove with chubby legs that resembled a dachshund.*

with a thin woody covering) or punk. Charcoal would, I suppose, have been the most efficient, if expensive agent. But once barbecuing would have been considered frivolous in wartime, there was little charcoal available.

As for performance, I remember stoves so eager that they roared like dragons and shot tongues of flame around the edges of the door, and through the seams; and one, at last, which was so reluctant that one could have sat on it with comfort. As a matter of fact, I used to bath the twins in its oven. This was a large, comparatively modern model, in a cottage in Pointe du Hène.

The asparagus-cum-punk mixture, which I had purchased at enormous price, proved so inefficient that my breath was more easily visible than the steam from the kettle. I used to insert bath, babe and head in the large oven, later transferring the red child to its cot, which was completely surrounded with quilts. The heat was so eager that there was no risk to the child in this operation, although I got several sty knocks on my cranium before I

learned to duck when I withdrew from the oven. I prepared all our meals on a two-burner electric plate and a coffee-maker.

The shiny white porcelain gas range upon which I had cooked our first Christmas dinner, in Moncton, proved an aesthetic, rather than practical comfort, since pressure on the natural gas was often low in winter. It was decidedly low on December 25 . . . so low that it was 11 p.m. before my husband and I sat down to roast turkey hide (the only part that was cooked) and ice cream. We had staved off hunger with cheese thins and spirits, but the twins — then three weeks old — screamed with hunger and colic from lukewarm formula.

We did not spend a Christmas together again till the end of the war, when the twins were almost three. It was not unnatural, then, that I should aspire to a good old-fashioned Christmas. The menu was elaborate, and featured many traditional dishes. Too many. Doggedly, I who had cooked little else but custard puddings and a chop at a time, worked my way through course after course, in each of which the component dishes were either raw or

overcooked and never arrived on the table at the same time.

Still, I was buoyed up by the thought of the pièce de résistance, a great plum pudding made after a recipe I had clipped from a magazine. Jam-chock with rich and rare spices, glossy dark brown and shaped in a perfect sphere, it was to be studded with small red candles, topped with holly and wreathed in flaming brandy. Anyway, that's how the illustration showed it.

But, somehow, the pudding I had created missed the mark. The dish I eventually presented to my family might better have been described as Candles-in-Quagmire. For when I turned it out from the steamer, it slopped over the edges of the silver platter like porridge. It was grey as porridge, too. "Never mind," I cheered myself, "after the candles and brandy are lighted no one will notice." I stuck the little red candles into the pudding, working fast, as they showed a disposition to list over.

I quickly touched a match to each taper, but as fast as I lighted them, they sank down into the sog and guttered out.





*Resigned, I covered the dismal thing with as large a branch of holly as I could find, and bore it to the table.*

"Never mind," I persisted, "when the brandy is lighted, no one will notice," and poured on the brandy. And poured, and poured.

For no matter how fast I applied the match the brandy disappeared into the marsh like water into a sponge, and would not light. Resigned, I covered the dismal thing with as large a branch of holly as I could find, and bore it to the table. My tears were mingled with those of the tired, hungry children as I set it down before my husband and as, later, I returned it, untouched, to the kitchen.

An ironic afternote to the incident is that when, on Boxing Day, I packed the pudding back into its mould and heated it in the oven, it emerged round and dark brown and firm as in the magazine picture. When I lighted the brandy it ignited enthusiastically. The babes, served first, gobbled up the goody and clamored for seconds. Their little eyes were bright and they laughed uproariously.

I was busy in the kitchen getting the coffee started, so did not immediately discover the reason for their glee. Then I took my first spoonful of the transformed pudding. It was completely saturated with its successive dosings of brandy . . . the little ones were drunk as lords.

The stoves and cookers which I have described earlier were, of course, marvels of modernity compared with those upon which our ancestors prepared their feast. The great-great-granddaddy of all cooking devices was the open fire. Stone Age man boiled water in pits lined with pre-heated stones, and cooked flat cakes of pulverized grain on a flat stone slab over the pit fire. Smoke escaped through the doorway or through a hole in the roof.

The Ancient Egyptians roasted vegetables in the ashes or cooked meats and vegetables in metal cauldrons resting on a stone or metal slab over an open fire; a servant kept the fire alive by means of bellows attached to his feet, or with a fan. The Romans baked in portable ovens of iron, earthenware or brass, set beneath an open fire. They heated cauldrons on spits over a hearth, and set smaller vessels upon a raised hearth. Wall vents and a chimney conducted the smoke outside.

In Norman England, cauldrons stood on metal legs over a stone slab hearth. Meat was roasted on spits. In the 11th century these central hearths were replaced by wall fireplaces, with stone hoods and side vents for smoke. Side cranes held pots over the flame and bread and cakes were thrust into the oven on peels, or long-handled shovels.

Feasts were enormous at this period. Contemplate the list of foods for an inaugural





*Sometimes, just for old times' sake, I pull up the kitchen stool beside my modern electric range and read there.*

celebration of the Archbishop of York to which 6,000 guests were bidden in 1467: 104 oxen, 6 wild bull, 500 deer, 1,000 sheep, 304 calves, 2,000 pigs, 400 swans, 1,000 geese, 1,000 capons, 104 peacocks, 3,500 other birds, 608 pike and bream, 2 porpoises and seals, 300 grams of heat, 1,500 hot venison pasties, 13,000 allies, custards, tarts, etc., 300 tuns of ale, 100 tuns of wine.

Meats and pastries were enclosed in pastry "coffins" and the festive board was decorated with cooked and gilded peacocks, and "subtleties" of marchpane shaped like animals, birds and flowers and dyed with vegetable juices and blood.

By the middle of the 15th century, a great spit rested on iron dogs before the hearth. A turnspit boy, protected by a shield of wet saw, kept it turning. The 17th century saw the first mechanized fireplaces, with spits raised and lowered on chains and a mechanical spit-turner; and the first steam cooker — a marvelous contraption called a galigester.

Gal made its appearance in England as early as the 17th century, and lightened the labor

of continual stoking. Spits now had an iron basket or cradle set into their middle to hold roasts or baking, and portable tin ovens were set with their mouths open to the fire. Late in this century, the hob grate was in general use. Small vessels sat on pierced cast-iron plates over a high brick base, and in the 18th century a moveable iron screen or "cheek" in front of the fire controlled the heat while dampers had been introduced into vertical flues.

The first closed-top range was invented in 1802. Gas cooking was first tried in 1779, and in 1841 Alexis Soyer publicly demonstrated its efficiency by roasting an ox in a brick oven by means of 216 gas jets.

The "modern" range of our great-great-grandmother's time, around 1850, still sat in a deep wide fireplace, but it was closed and had large ovens and a warming closet. It was about seven feet long, and could cook, at the same time, 28 pounds of bread, 20 pounds of meat and boil six saucepans of water.

A pioneer electric cooker was exhibited at the Crystal Palace in 1891 and a complete

electric kitchen with a compact cooking range was shown at the Chicago World Fair in 1893. But it was not till the thirties that the electric range became popular. I can recall that we had an elegant affair of white and black porcelain, standing on tall, slender legs . . . the pride of my Hydro father and I daresay a great boon to my mother, who had until then supervised the preparation of hundreds of family meals on a succession of black monsters.

Sometimes, just for old times' sake, I pull up the kitchen stool beside my modern electric range and read there. And at Christmas I will cook a turkey and plum pudding and mince pies. We will read the mottoes from the Christmas crackers to each other and pull favors from the pudding.

The sentiments will be as ancient as the feast. But I'll forego the gilded peacocks and boar's head with almond tusks that graced Medieval boards. Nor will I miss the antiquated hearths. Not for me, a truly old-fashioned Christmas! □



# THE ENERGY CRISIS

by Bill Settatree

Energy, or adequate supplies of it, is one of the most critical problems facing us today. On one hand, society is demanding cleaner air and a better environment while on the other expanding at a rate which requires stepped-up energy production.

On radar, the Anglo-French Concorde, which recently made its maiden flight, looked much the same as any other aircraft. But its landing signalled the arrival of a new era in aviation history — that of the supersonic jet transport.

Not far away, in jet age terms, but centuries removed from the point of view of technology, an Arab leader issued one of the world's major oil producers with an edict to reduce production by 110,000 barrels a day. Conservation was given as the reason, but there was speculation that the move was intended to create an artificial shortage that would increase the market price for oil. And, in the United States, the president of a large electrical utility took stock of his diminishing coal piles and fired off a telegram to the White House requesting that consideration be given to a total ban on coal exports.

What do these three events have in common? Not very much, perhaps, but they

could all affect world energy markets and resources with repercussions echoing all the way down to Mr. Jones and the price he pays for electricity in Toronto, Apple Hill, Ottawa or wherever he lives.

Energy, or adequate supplies of it, is one of the most critical problems facing us today. On one hand, society is demanding cleaner air and a better environment while on the other expanding at a rate which requires stepped-up energy production.

In the middle is the electrical utility trying to provide a vital service and at the same time attempting to overcome objections to its methods of doing so. And while newspapers across the US and Canada play up the energy crisis, scientists and engineers are exploring solutions to the problem.

More stringent environmental controls have, in their own right, contributed to the fuel shortage. Legislation governing the quality of coal consumed has been imposed

to reduce air pollution. Since generating stations use more than half the coal produced today, they are hardest hit.

Consequently, coal companies find it increasingly difficult to keep up with the demand for low-sulphur coal and utilities are uptight because they can't get enough.

Last year, for example, the consumption of bituminous coal in the US exceeded the output. Exports jumped almost 12 per cent to 57 million tons and domestic consumption was 507 million tons of which 308 million were used in the generation of electricity. This was an increase of 14 million tons from 1968.

For the first eight months of 1970, production of coal in the US totalled 308 million tons. This represents an increase of 6 per cent over last year, but is nowhere near enough to meet the demand.

Many utilities are reporting their stockpiles down to less than 10 days' supply. Pressure



*According to a British study, supersonic aircraft such as the Anglo-French Concorde will put a serious strain on world oil reserves by the end of the decade.*



and been put on the railroads for hopper cars to rush coal to the electrical plants. But even hopper cars are in short supply because the crisis was not foreseen in time to ensure that more cars were built.

The shortage in the US is also having its effects on Canadian utilities, which have increased their requirements for coal over the past several years. Of the 11 million tons used in Canada by utilities last year, Ontario Hydro consumed seven million.

Hydro has ordered 13 million tons this year, but will receive less than 10.

The shortage of coal, particularly that with low-sulphur content, has exerted a strong upward thrust on all fossil fuel prices and in four years Ontario Hydro's expenditures on coal have more than doubled because of rising prices and increased consumption.

Coal producers have been criticized at times for concentrating on export markets where their product can be sold at a higher

profit while neglecting the requirements of American customers. In reply, the coal industry claims some utilities have for years contracted on a long-term basis for less coal than they actually required, and have augmented supplies with purchases from desperate suppliers at depressed prices.

Technology, itself, has compounded the problem. Sensing the imminent development of nuclear plants and a consequent shrinking of their markets, coal companies have been loath to invest in new mines. But the completion of many nuclear plants has been plagued by delays, placing an added burden on coal-fired generating stations.

Further complications for the coal producers stem from health standards imposed on mining operations, and the growing affluence of labor has also dealt a severe blow. Coal mining is now considered an undesirable occupation and jobs are becoming increasingly difficult to fill.

The whole problem doesn't really evolve on an actual shortage of coal. American reserves will last an estimated 1,500 years. Rather, it is tied to the quality of the product and the coal industry's insecurity about its future.

"It's a question of supply and demand," says Ray Cohen of Hydro's Supply Division. "A few years ago there was a surplus of coal and uranium was in short supply. Today, you can buy uranium at rock bottom prices and coal is virtually rationed."

The situation could reverse itself in a few years when nuclear plants catch up.

Meanwhile, something must be done. One of the areas being explored is the development of air purification equipment that will allow high-sulphur coal to be used by electrical utilities.

Fifteen American utilities and Ontario Hydro are financing a \$6,500,000 project





aimed at developing a system to remove sulphur dioxide from the chimney effluents of their plants. The project is being undertaken by Babcock-Wilcox Company and Esso Research and Engineering.

As well, Hydro and five other utilities are backing a \$1,600,000 research program being conducted by a major supplier — Consolidation Coal Company. And Hydro is continuing research on its own. Expenditures by the provincial utility on quality control equipment, including highly efficient precipitators and tall stacks, now exceeds \$50 million.

Alternative sources of fuel must be examined. The crisis in the US has helped to bolster the coal industry north of the border, particularly in the West. Canadian coal is being exported in large quantities to Japan and other overseas markets. Ontario Hydro is one of several utilities looking at Canadian coal and is currently exploring the possibility of buying coal from Western Canada.

Western Canadian coal will cost from 20 to 40 per cent more on a cost per BTU basis than US coal depending on the destination, but it has the advantage of a low-sulphur content.

Tests have been carried out at Thunder Bay generating station on a low-sulphur lignite from Saskatchewan. Hydro bought about 400,000 tons of this coal in 1970.

Oil is a major alternative to coal and Ontario Hydro is building Canada's largest oil-fired generating station near Kingston. The 2,300,000-kilowatt Lennox plant will use more than 14 million barrels of oil annually. By 1980, oil will produce about 10 per cent of the province's electricity.

Ontario Hydro has also commissioned a study to determine the feasibility of utilizing crude oil, as opposed to residual oils, as a fuel for thermal-electric stations. Long-term studies indicate that demands for residual oils could create a shortage.

Oil was chosen for the Lennox station partly because of the difficulty of getting coal and partly because construction and maintenance costs will be lower than for coal or nuclear plant.

More and more utilities are looking toward oil and this will place an increased burden on world reserves. The supersonic jet and other technological developments will add to the dilemma. According to a British study the planned fleet of supersonic transports will by 1980 demand the production of about 320 million metric tons of crude oil each year. This is nearly one-third of the total planned oil consumption of Western Europe or the United States in the same year.

Already the danger signs are up and the White House recently agreed to relax quota restrictions on oil imports from Canada to help ensure adequate US supplies this winter.

Utility experts are looking at natural gas, too. A severe shortage in the US has



to increasing demands for Western Canadian coal. Left: construction of pipeline by TransCanada PipeLines will bring additional quantities of natural gas to eastern markets.



prompted the Canadian government to step exports by 50 per cent.

Natural gas can be burned in power stations and Hydro has contracted for 49 billion cubic feet a year to fire part of Toronto's L. Hearn generating station. This is equal to 1.8 million tons of coal. In the process, Hydro will become the biggest customer of its major competitor.

The biggest problem with natural gas is the transportation of sufficient quantities from Western fields. It produces negligible amounts of sulphur dioxide on combustion, although stack emissions do include traces of nitrogen.

While a six-man Hydro task force takes a close look at all facets of the world fossil fuel supply, the utility is pressing on with its nuclear power program as fast as it can. However, technological problems and limited operating experience have put out an all-nuclear construction pro-

gram. Hydro is convinced that nuclear plants will be the answer to its problems. Nuclear plants are virtually pollution free and this country has vast resources of uranium.

Ontario Hydro has two nuclear plants under construction — Bruce, on Lake Huron, and Pickering, on Lake Ontario. In addition, it operates the Douglas Point nuclear plant which is owned by Atomic Energy of Canada Limited.

By 1980, Bruce and Pickering will together provide 5 million kilowatts for the Ontario system, roughly 19 per cent of Hydro's predicted electrical capacity. Fossil fuels, particularly coal, are now the number one item on Hydro's shopping list, and will continue to be the predominant fuel for thermal-electric plants, accounting for nearly 56 per cent of the system's estimated 26,000,000-kilowatt capacity by the end of the decade. Hydro's 1970 coal bill has been estimated at \$100 million. Five years ago it was only \$35 million.

While economists tally up the world's energy reserves and the engineers look for the ways and means of best utilizing them, other scientists are searching for still new sources of energy.

Some of the methods sound like science fiction. Breeder reactors which produce more fissionable material than they burn, the harnessing of the sun's rays and the tides of our oceans, nuclear fusion and the production of electricity from a plasma of hot gases are all considered feasible to a greater or lesser extent. There's even talk of creating power by utilizing the rotation of the earth.

Technology, in fact, has a way of overcoming problems and the work of many scientists is geared to solving the energy crisis. □





# POSTAL POWER

Post offices the world over provide more than just the distribution of mail. The governments of many lands pay honor to their native sons and heroes and tell of major technological and cultural accomplishments through the simple but effective medium of the postage stamp.

The following pages provide a graphic account of how post offices have commemorated the universality and indispensability of electricity. It must be recognized, though, that the stamps

represent only a sampling of the issues related to electric power.

## For the philatelist . . .

Argentina : stamp was issued on December 22, 1956, to commemorate the 250th anniversary of the birth of Benjamin Franklin, the American scientist.

Belgium : this stamp was issued in 1930 for the Liège Exhibition and was in honor of Zenobe Theophile Gramme, inventor of the magneto.





Hungary: issued the stamp at top right in honor of Thomas Edison.

Yugoslavia: issued in 1956 to commemorate the 100th anniversary of the birth of Nikola Tesla on July 10, 1856. Tesla was born in Yugoslavia, but made his mark in the US as the first to conceive an effective method of utilizing alternating current. He patented the induction motor.

France: issued February 27, 1936, to commemorate the 100th anniversary of the death of French scientist André Marie Ampère, whose name was adopted as the standard measurement determining the strength of electric currents. Stamp's catalogue value is \$9.

Italy: issued in 1927 to mark the centenary of the death of Count Alessandro Volta, one of the leading electrical experimenters.





Ireland: issued October 5, 1930, to commemorate the opening of the Shannon River development.

Albania: a composite picture (center left) of the Lenin hydro-electric plant.

Austria: commemorates a major transmission system.

United States: stamp was issued September 30, 1935, to commemorate the dedication of the Boulder Dam on the Colorado River.

New Caledonia: issued September 20, 1959, to commemorate the dedication of the Yaté Dam.

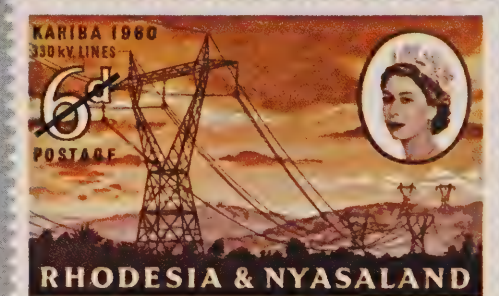
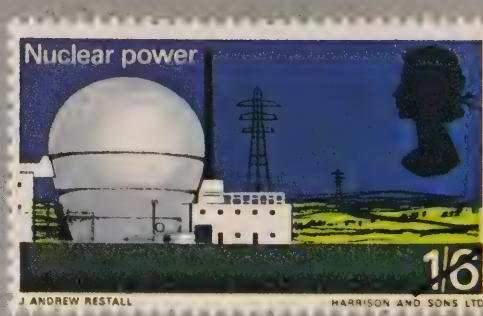
United Arab Republic: issued in 1960 in honor of the Aswan High Dam that will ultimately produce 2,100,000 kilowatts from the Nile.

Japan: commemorates completion of the 350,000-kilowatt Sakuma Dam. Issued October 15, 1956.

USSR: the V. I. Lenin Dneproges power station on the Dnieper River was originally put into service in 1932, but was destroyed during the second world war. It was later rebuilt.

Canada: peaceful uses of atomic energy and Canada's nuclear power program





are depicted in the five-cent stamp showing the nuclear plant at Douglas Point on Lake Huron. Below is a 14-cent stamp issued in 1946 which shows a generating station on the St. Maurice River in Quebec.

Rhodesia and Nyasaland: these stamps were issued May 17, 1960, to commemorate the opening of the Kariba hydro-electric scheme by Queen Elizabeth.

Great Britain: Windscale stamp (extreme right) was issued September 19, 1966, to publicize British technology. Advanced gas-cooled reactor has a capacity

of 28,000 kilowatts. Dounreay stamp, issued July 1, 1964, publicized the 20th International Geographical Congress in London. Dounreay is an experimental fast-breeder reactor.

Iceland: this stamp was issued in 1956 to recognize the Sog hydro-electric development.

France: the Donzère-Mondragon stamp was issued October 6, 1956, to honor French technical achievements. Placed in service in 1952, this 300,000-kilowatt station stands on the Rhone River.



# Keeping to the Straight & Narrow



While the horse-drawn plow is a guaranteed traffic-stopper these days, one Ontario event permits the purist plowman to climb down from his tractor once a year and till the soil in the centuries-old tradition of his ancestors.

Not that the International Plowing Match sponsored annually by the Ontario Plowmen's Association ignores the tractor. Most of the classes are geared to mechanized agriculture, in fact. But the inclusion of horses gives both spectators and contestants an opportunity for nostalgia while casting acquisitive glances at the latest offerings from the manufacturers' assembly lines.

This year's match was held on the fertile clay loam west of Lindsay. It attracted 900 contestants from Ontario, Quebec, New

Brunswick and Saskatchewan and it gave rise to a 75-acre tent city occupied by 300 exhibitors offering every service imaginable to the farm industry.

Highlight of the event is the selection of an Ontario champion plowman, who then becomes eligible for the Canadian competitions. Beyond these lies the world match, which this year took place in Denmark.

Competitors in the Ontario championship class must plow one plot of grassland in three hours and one of stubble in two-and-a-half hours. Among the points considered by the judges are straight furrows of uniform height and width. Contestants are also expected to build a perfect crown, set up uniform, well-packed seed beds and bury all vegetation so that it rots quickly to provide organic fertilizer and leaves drainage channels under the furrows.

To power the canvas city which sprang up virtually overnight, Ontario Hydro crews from the Fenelon Falls area strung 40 poles with about 50,000 feet of conductors and installed 18 transformers. They also erected forty 400-watt dusk-to-dawn lights to illuminate the city's four main streets. Half a mile of single-phase line to the site was converted to three phase to handle the load to nearly 160 customers. A further Hydro service was the provision of free hot water for anyone who wanted to help themselves.

Traditionally, Hydro has a long association with the plowing matches — now in their fifty-third year. That's hardly surprising, though, considering Hydro's 60-year tradition down on the farm. □

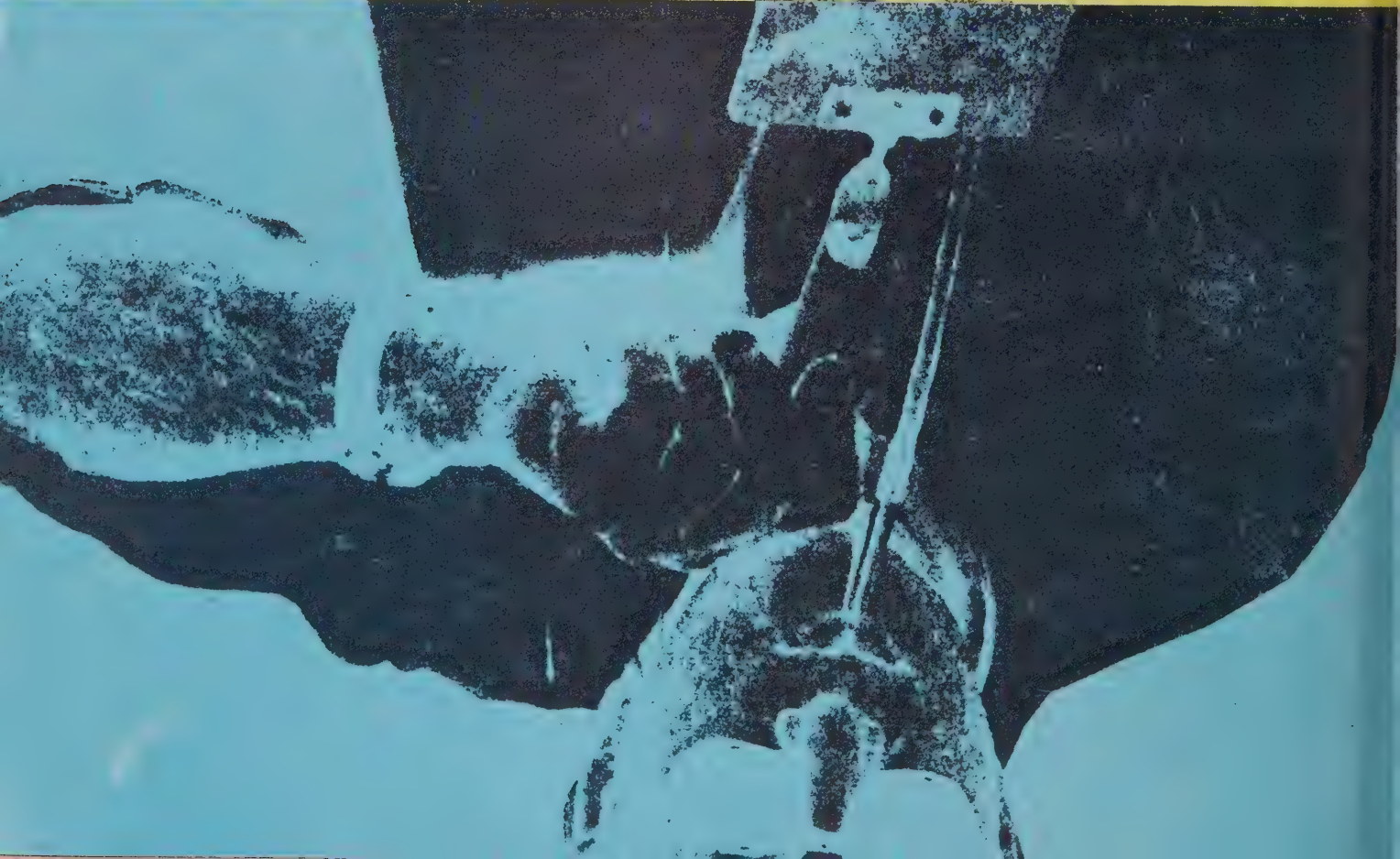




*Horsepower in the original as well as the modern sense had ample representation at the plowing match. In spite of the mud, crowds thronged 75 acres of tents and exhibits.*









# GLASS MASTER

by Rae Hopkins

Rex Bailey is a master scientific glass-blower. He also teaches painting, and poetry, and music, and sculpture, and ceramics, and — for a change of pace — gourmet cooking.

His warm, friendly eyes are almost always concealed behind dark brown prescription lenses. They've become super-sensitive to light, a legacy of many years of flashing blue-and-orange flame, fine print, oil and water colors, and acids. But at 60, he has all the vitality of a youth half his age, the worldly experience of a man twice his age, and a skill that historians say dates back to the Ancient Egyptians.

Rex Bailey is a master scientific glass-blower — one of only nine in Canada and fewer than 50 in North America. He lives in Deep River and earns his living at Atomic Energy of Canada Limited's Chalk River Nuclear Laboratories.

Little did Mr. Bailey think, that day back in his native London, England, when he answered an advertisement during the Depression for men trained in art to learn the highly-skilled craft of glass-blowing, that he'd end up in charge of the best-equipped glass-working unit on any research project in the world.

Nor did he ever think that he'd end up in a line of insurance companies rate more

dangerous than the perils faced by a steeplejack. There's always a risk of serious burns, eye damage or explosion confronting the men who work with molten glass, the underwriters say.

Seated in his comfortable drawing room — one of his own design featuring walnut-panelled walls and fancy glass dividers — Mr. Bailey points to a three-foot-square abstract painting at the south end and says it's his impression of the aftermath of the bomb. It's done in reds, whites, yellows, greens and a host of in-between shades. He's been offered \$2,000 for it by a private collector in Detroit. He turned it down.

Then he points to a life-like oil of the widow Coretta King, done just after Martin Luther King's assassination. "One of my students painted it," he says.

Rex Bailey's not just a master craftsman. He's an artist. He teaches oil and water colors, and poetry, and music, and sculpture, and ceramics, and — for a change of pace — gourmet cooking "just to keep myself from becoming bored."

And, as he puts another tape cartridge into his stereo player, he likes to reminisce. He

tells about answering that classified ad in London and having been accepted as an apprentice to master glass-blower Bruno Viktor Sauer. It took him seven years to qualify.

It wasn't easy. With practically no scientific background, he was required to take evening classes six nights a week to learn applied physics, chemistry and mathematics "to get some idea of the fundamentals that would permit me to design and construct scientific equipment."

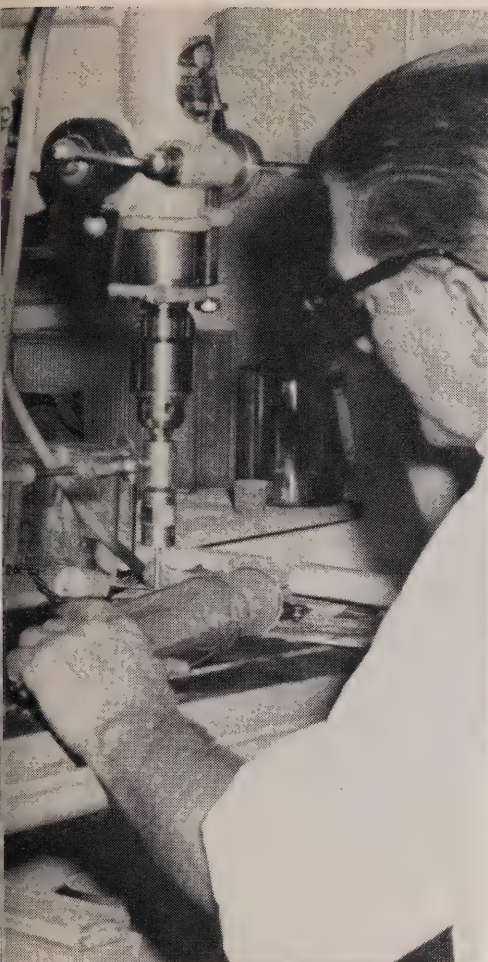
Rex comes from a long line of artists — his father was a musician who played 19 different instruments while his mother was an accomplished portrait painter. All on his father's side of the family were involved in art of one form or another. So is his son, George — he's a photographer with the Canadian forces.

With seven years of intensive training to his credit, Rex started moving around the "big London shops to gain experience." Three years later he started globe-trotting to Persia, Iraq, Syria, Saudi Arabia, Kuwait,









*Glass master Rex Bailey is exactly that. At his command, an ordinary tube of heated glass will take on myriad shapes or sizes. Specially-designed water-cooled diamond drills, left, avoid shattering of the delicate scientific apparatus while highly-skilled fingers create the master's touch. Finished products are placed in ovens for annealing.*



alestine, Egypt and Cyreniaca in North Africa as a master glass-blower with the British government.

Many of his scientific creations remain in laboratories around the world while his home is filled with replicas of native articles which he has seen and copied — in glass.

Rex returned to England from North Africa after contracting malaria. But in 1949 he responded to a call from Canada's National Research Council, which was seeking a glass-blower for Chalk River.

CRN wanted one top man and another who would follow in his footsteps. John Mesanko was apprenticed to Rex and is now, himself, a master scientific glass-blower at the "plant."

In their ultra-modern shop, the two glass-blowers are called upon at a moment's notice to fashion practically any type of glass apparatus on their lathes or with their traditional blow-pipes.

Necessity, it's been said, is the mother of invention. Whoever said it may well have had Rex Bailey in mind at the time, for over two decades at CRNL he's shaped

gadgetry in glass that in any given year would cost well over a quarter-of-a-million dollars on the open market. It couldn't be bought, anyway.

Fractionating columns, mercury or oil diffusion pumps, apparatus for biology, special quartz-glass gimmicks for metallurgical investigations at extremely high temperatures, plasma tubes, laser tubes, micro-balance shields and countless other pieces of scientific paraphernalia are turned out by Rex Bailey's shop.

"If it can be made of glass, we can make it right here," he says.

Glass used in the shop comes in tubular form from Corning, N.Y., and includes such varieties as quartz, soda-glass, lime-glass, uranium-glass, cobalt-glass and lead-glass.

And glass, it's said, was one of the first materials made by man. Pliny the Younger records that glass was discovered accidentally by sailors forced ashore on the coast of Phoenicia. While they were cooking their meal, the story goes, alkali fused with sand to make a glaze.

Modern authorities disagree, but suggest that glass-making was known in Egypt

prior to 1800 BC. The Ancient Egyptians were not only acquainted with glass, but knew how to stain it and produced articles with extraordinary skill.

Once in a while, Rex Bailey will give an ornamental glass-blowing demonstration for charitable organizations in the Deep River area, showing how long-necked swans and other trinkets take shape from a glob of molten glass. But his chief interest is in the scientific aspects of his craft.

Rex is due for retirement in five years, but it's unlikely that he'll ever stop work. When he leaves the laboratories, he intends to paint and write. He's seen a lot of the world and wants to tell people about their counterparts over the horizon. For Rex Bailey, master craftsman, painter, sculptor, and musician, is also a humanitarian. □



# protect ontario hydro - hugill

The chief role of the municipal electric commissioner is to protect Ontario Hydro against political interference at the provincial level, says OMEA president D. G. Hugill.

Speaking to delegates at a District 7 meeting in Zurich, Mr. Hugill said there are "those in all parties at Queen's Park who would like to see Ontario Hydro become just another department of the provincial government. We commissioners must drive home the facts of municipal ownership of the system since its beginning."

He repeated his warning at a District 8 meeting in Blenheim the following morning.

Mr. Hugill said that from the start, the OMEA has been the political arm of Ontario Hydro on the one hand and the representative association for the majority owners of the system on the other.

While he advocated complete support of Ontario Hydro, Mr. Hugill said he did not advocate "blind, unquestioning support — for that type of support is what leads to commissioners becoming rubber stamps, and unnecessary, and finally extinct."

"Rather than allowing this sort of thing to happen, we must increase our knowledge of all that goes on, like power costing and marketing, so that we can properly assess power cost increases — or decreases — and determine what is adequate for a marketing program," Mr. Hugill said.

"After all," he added, "we're the ones who should know why it's necessary to raise power rates because we must defend this decision in the political arena. When we're consulted about these matters we have to get answers to our questions, offer alternatives if we think they're better and agree wholeheartedly with the final policy adopted after our joint efforts."

And he warned that any passive, acquiescent attitude should have no place in the OMEA, "for it's the quickest and surest way to oblivion."

## sell to succeed says president

OMEA District 7 president Ross Fewster criticized "groups within the Ontario Municipal Electric Association and Ontario Hydro who still consider a well-planned and aggressive sales program insignificant to the long-term success of the utility industry."

Speaking to delegates in Zurich, Mr. Fewster said there is within and without the electrical industry a "significant and growing population asking why does Hydro need a sales program when power is scarce

and money to build generating systems expensive?

"We can understand people outside the industry may not appreciate the need. However, I do not think we can credit those in the industry lacking an understanding of this vital need," Mr. Fewster told the meeting.

He added that utilities have a need for a sound marketing program and an aggressive sales promotion campaign. "Some utilities in our area, and in others, have been noticeably successful in capturing new loads, while others have been noticeably unsuccessful and have lost valuable heating load, both water and home, to the competitors."

"We have within our industry a segment who do not think we need to sell. This segment we do not need. It's time we all realized that we may have to increase our costs to achieve results and regain our expenses plus some margin of profit. Our competitors in the energy market are spending much more on advertising and getting results at our expense," Mr. Fewster said.

During the afternoon session, delegates voted to approach their individual commissions with the idea of forming a Compec (Co-operative Marketing Plan for Electrical Utilities) group for the district. It was agreed each commission would forward a resolution to the district secretary indicating whether or not they were interested in forming a sales co-operative.

## cauliflower an educated cabbage

"A peach was once a bitter almond and a cauliflower is nothing but a cabbage with a college education."

Mark Twain said it.

And Lambton Community College president George Delgrosso agreed with it.

Speaking to delegates at a District 8 OMEA meeting in Blenheim, Mr. Delgrosso said community colleges are a hard beast to label, but are the most democratic form of educational institution in today's society.

The Buffalo-born professor of anthropology said that unlike many universities, a community college does not cater to the concept there should be any such thing as a second-rate citizen.

"The academic philosophy of a community college is not like that of other educational institutions. We do not believe in

theory for theory's sake. Nor do we believe in research for research's sake. We place our emphasis on application."

"Community college students are attending school to learn a trade or skill that is applicable in today's society. And that's a realistic approach to education," Mr. Delgrosso said.

He added that education for education's sake, a degree for a degree's sake, means absolutely nothing. "Application means everything. We, in today's society, have suffered very badly through academic snobbery. As a former university professor I was told when I decided to make the change to a community college that it wasn't academic. This ridiculous concept about paper credentials is exactly what the youth today are revolting against — and they can all be wrong all the time."

Students, Mr. Delgrosso said, are always must be the ultimate in any educational institution. The community college concept is exactly that. "We won't turn people away for the lack of a high school education, or those so-called high standards of many universities. We believe education must prescribe the medicine for the illness the unemployed has, not for the illness we think he should have. If turning away students who fail to meet these high standards is what education's all about, then what are we doing here anyway — other than wasting taxpayers' money?"

From the standpoint of finances, he said the cost of education can be extremely high. "We find even in Lambton College it's amazing the number of young people who are living from hand-to-mouth, and the tuition in any community college in the province is only \$150 a year. Even at that 50 per cent of our students have applied for student awards and if they don't come through they'll have difficulty in sticking around for another few weeks."

He attributed the difficulty experienced by students in getting tuition fees to the general employment situation where summer jobs are in short supply.

President Joe Young told Mr. Delgrosso that the district's bursary committee had recommended splitting its \$300 annual bursary into two \$150 bursaries and had made community college students in electrical technology eligible to receive an award.

Overwhelming approval was given to the proposal by bursary committee chairman M. J. Evans, of Point Edward, who told delegates the committee had to turn down applications from 20 community college students seeking to become electrical technologists.



## district 7

The men who will lead OMEA District 7 for the coming year include, back row, left to right, C. V. MacLachlan, Ingersoll, secretary-treasurer; G. H. Hess, Zurich; W. R. Gifford, Aylmer; G. D. Lang, St. Thomas; Murray Greene, Exeter and William Thompson, Watford. Front row: F. T. Julian, Woodstock, second vice-president; Ross Fewster, Ingersoll, president and Robert Austin, Arkona, first vice-president.



More than a half-century of service to the people of Southwestern Ontario as recognized with the presentation of long-service awards at Zurich. Recipients were L. W. Smith, Tilsonburg, 15-year certificate, Gordon Fraser, Arkhill, 25-year cuff links and Garfield Munroe, Glencoe, 15-year certificate.



Ontario Hydro commissioner Dr. J. D. Fleming, second from right, is welcomed to town by Zurich contingent Herbert Turkheim, Robert McKinley, MP, and G. H. Hess.

## district 8

Lambton College president George Delgrosso, right, told delegates to OMEA District 8 convention that the community college concept of education is the "now learning." Long-service awards were presented to C. Nelson, Wheatley, Alex Bowman, Blenheim, both for 25 years, and John Edwards, Merlin, for 15 years as a Hydro commissioner. OMEA president D. G. Hugill made the presentations.



It's not exactly a swinging group, but the new executive of District 8 has pledged to put a little more zip into OMEA meetings. With leader Fred DeSantis, of Kingsville, at the piano are J. G. Young, Tilbury, second vice-president; M. J. Huddlestone, Petrolia, first vice-president; Carl Phair, Blenheim, director, and John Sanger, Kingsville, first vice-president.





## along hydro lines

### Gentilly fuelled

Fuelling of the reactor at Hydro-Quebec's \$110 million Gentilly nuclear power station, on the south shore of the St. Lawrence River midway between Montreal and Quebec City, is completed. The reactor has now gone critical.

Gentilly's 65-ton load of natural uranium is equivalent to the energy produced by 1.3 million tons of coal. The plant will have a capacity of 250,000 kilowatts.

Fuelling involved placing 10 bundles into each of 308 channels. As unused uranium fuel is only slightly radioactive, it was possible to complete the task by hand. Now the reactor has gone critical, refuelling will be carried out by remotely-controlled machines similar to those in use at the Douglas Point station on Lake Huron.

While a variation of the CANDU system, the Gentilly reactor differs from any other large Canadian nuclear reactor in that it uses boiling light water as a coolant. Others use heavy water for cooling purposes. However, the Gentilly plant, like all CANDU units, uses heavy water as a moderator to slow down the fission process. □

### Stack pact

An Ontario Hydro contract worth close to \$2,000,000 has been awarded to the Canadian Kellogg Company for a second 655-foot stack at Nanticoke generating station on the Lake Erie shoreline eight miles east of Port Dover.

Work will begin next August. Earlier this year, expansion of the plant from four to eight 500,000-kilowatt units was announced, making the coal-fired plant one of the biggest in the world.

All eight units are due for completion in 1977, with first power expected next year. □

### Power plant simulator

An idea used by airlines for training pilots has been adapted by the UK's Central Electricity Generating Board and is causing raised eyebrows as far away as Australia and South Africa.

CEGB has installed a power plant simulator in Leeds, Yorkshire, to train station personnel and offer refresher courses to trained operators.

The simulator, which represents a complete generation, transmission and distribution system, is the first of its kind in the UK.

Control desks simulate under normal operating conditions, or under fault conditions, a typical 500,000-kilowatt unit and auxiliary equipment. Also included is a control panel for a 275 kva sub-station. □

## Electrics, anyone?

Hydro-Quebec is carrying out an intensive investigation on the production of electric cars in the hope of capitalizing on the second car market, expected to reach 600,000 in the province by 1980.

Electric cars, Hydro-Quebec officials point out, would be highly suited to the second car market, which would consist of mainly urban traffic. If these 600,000 cars were run on batteries, recharging would consume more than 9 per cent of the utility's annual domestic load in 1980.

## Meterman of the future

Gone is the day when a meterman could be portrayed as a "nice guy, jack-of-all-trades but master of none," says AMEU president H. J. Murphy.

Speaking to close to 200 delegates attending the association's annual two-day metermen's workshop in Toronto's Skyline Hotel, Mr. Murphy said the meterman of the future will have to be a well-trained technician possessing a good basic education supplemented by a sound knowledge of meter theory and practical application.

Mr. Murphy described the meter as the "cash register of the utility." He said loads for the larger complexes being built in many cities are now being recorded on one meter.

"Consider the drastic effect incorrect metering could have on the financial returns of a utility with loads in the 15 to 30 megawatt range," Mr. Murphy said.

Suggesting that utilities are growing rapidly and the development of regional government is accelerating at the same pace, Mr. Murphy said all utilities will find it essential to have a meter department with competent personnel and a modern, well-equipped meter shop.

Among the highlights of the workshop were an "informational please" panel in which participants dealt with such subjects



*Team effort*

methods and economics of relocating indoor meters out-of-door; the results of a color-coded wire questionnaire; statistical sampling; problems of administration; new methods of sealing meters; and how new metering methods affect safe practices. A part of the panel, shown above, includes R. Shillabeer, Scarborough PUC, C. Marlow, Kingston PUC, R. Davies, Niagara Falls Hydro, B. Croisette, Ontario Hydro, and moderator J. E. Moynes, Lindsay Hydro.

Delegates also heard a thorough discussion on the use of power capacitors and during the evening visited the Canadian Standard





Computer on show

Association's laboratories to see first hand the punishment electrical apparatus is subjected to in the interests of safety.

Several exhibitors displayed their wares at the workshop including a Wang mini-computer used to analyze variations in meter reading. Watching the device in operation are John Middel, of Harrow Hydro, Arnold Sandler, of the Wang Laboratories, John Murphy and J. R. Risebrough, of Oshawa PUC. □

## municipal briefs

In addition to preparing bills for mailing to 12 Southwestern Ontario utilities, London PUC's computer is also handling the bi-annual Ontario Hydro appliance survey for a sample 3,500 customers of those utilities. Len Berk, of Ontario Hydro's marketing research department, says it's expected that about two-thirds of all the households surveyed on a province-wide basis will return the questionnaires, which will aid in determining the market saturation of major electrical appliances.

St. Catharines PUC took to the air during construction of a 3,000-volt line to service the city's western sector. The PUC used an Ontario Hydro helicopter for pole-setting because of the difficulty in getting commission equipment across Twelve Mile Creek. The "chopper" placed six poles, averaging six minutes each from start to finish.

Regional Hydro and water services must remain with public utilities commissions to keep prices down, says the Association of Lakeshore Municipal Hydro and Water Systems. Representing 11 Oshawa area commissions, the association has called for the retention of Hydro commissions to look after electrical distribution. In a brief on the Oshawa Area Planning and Development Study Group, it recommends against water services being placed under council control.

Promotions announced recently by St. Catharines PUC include Robert Dyck, office manager, George Hostick, accounting supervisor, and Roger Day, data processing supervisor.

Thunder Bay Hydro has named former Regina director of engineering and public works, Walter G. Dolman, as general manager and secretary. He succeeds E. A. Vigars, who has taken an early retirement. Mr. Vigars was with the former Port Arthur PUC for 23 years and was named general manager of the Thunder Bay Hydro upon its formation last year. Mr. Dolman was born in Kenora and received his early education there. He obtained a BSc degree in electrical engineering at the University of Manitoba in 1950 and

later served as town engineer in Fort Frances and Selkirk, Manitoba. He was employed by the former Fort William Hydro as design engineer for eight years before attending the University of Western Ontario to obtain a master's degree in business administration. Mr. Dolman went to Regina after graduation from Western. □

## Harley A. McCallum

Harley A. McCallum was a second father to thousands of elementary and secondary school students across the province.

Mr. McCallum, a member of Ontario Hydro's public relations staff until his death at the age of 64, served from 1958 as liaison officer between Hydro and the Ontario Public School Trustees' Association, co-sponsors of the province-wide Ontario Public Speaking Contest.

Mr. McCallum began his Ontario Hydro career as a telephone adjuster in the former frequency standardization division in 1949. He was later appointed a domestic negotiator and then a commercial negotiator before leaving the department to assume duties with the public relations division.

Co-sponsorship of the contest was a new undertaking for Hydro when Mr. McCallum moved into public relations and only a few thousand students from elementary schools participated in the event.

With his assistance, the co-sponsors were able to attract both elementary and secondary school participation and last year more than 350,000 students competed at different levels leading to the provincial finals that determine Ontario's top young orators.

Although he never had children of his own, Mr. McCallum was often heard to say that he loved working "with the kids." □

## Nuclear squeeze



Breathing in

Few could qualify for Hydro-Quebec technician Kim Gjoa's job which required the slimness of a jockey and the agility of an acrobat. A recent project at the Gentilly nuclear power station called for a man capable of squeezing through an opening 6¼ ins. wide and working in an area less than twice that width.

Engineers decided they needed to cover three guide tubes extending into the reactor core with a zircaloy shroud.

Kim, who weighs 113 pounds and measures 28 inches around the waist, is shown proving to engineer Ray Westwood that he's the perfect applicant for the job. □



## Bubbling through the winter



Ready for the big freeze

Meaford PUC has an unusual winter load. A system of compressed air from weighted hoses allows air bubbles to bring relatively warm water from the harbor bottom to prevent ice damage to the hull of three pleasure craft now tied up at the town's wharf.

One of the vessels is being used as a ski lodge while employees of Cliff Richardson Boats are completing the interiors of two others. The two boats under renovation were unable to be brought out of the water because of their size.

So successful is the scheme that Mr. Richardson, who's also chairman of the Meaford utility, plans to use it for all-winter work on boats. □

## Reactor breakthrough

Canatom Ltd., of Montreal, has ordered a zircaloy calandria for a nuclear research reactor being designed in Canada for Taiwan.

Unlike calandrias in existing reactors, the Taiwan unit will be built entirely of zircaloy, an alloy of the rare metal zirconium with properties that make it especially suitable for the "heart" of a nuclear reactor. Strong as steel, it is nearly transparent to neutrons so that they can easily reach the experimental area outside the calandria.

Zircaloy has been considered as a potential material for calandrias in the past, but has only become commercially available in sheets large enough for construction of a major vessel. Although ideal for the purpose, the alloy is expensive and difficult to work. Welding has to be carried out under a blanket of argon, an inert gas, and the process must be done in an air-conditioned room under almost clinical conditions. □

## Talking of inflation

Maxwell Styles, British-born managing director of one of Chile's largest electrical utilities, finds it easy to understand the recent increases in the cost of electricity in Ontario.

He says that in his South American country an inflationary spiral of 25 per cent a year isn't uncommon. Nor is a twice-yearly rate increase by his utility.

"When I first started with the Compania Nacional de Fuerza Electrica in Vina de Mar we were happy with a 5 per cent increase in rates once a year. Now we're due to raise our rates 29 per cent in January, and we may have to consider a further increase later in the year.

"We live with inflation and have become inflation-minded. Our rates increase at practically the same percentage as the cost of

living, which is continually going up," said Mr. Styles, in Toronto recently while his wife was in hospital.

In this 3,000-mile-long nation, whose base economy stems from copper and nitrate mining, everything runs from north to south including electrical transmission lines and super highway. So narrow is Chile in some parts that you can drive across it in about an hour.

"Although we're a relatively poor nation, we have the latest electrical apparatus — we even get TV from the US and saw the moon landing," says Mr. Styles. "We light our streets with mercury vapor or high-pressure sodium lamps."

Chile at one time had large British and German colonies, but most of its 10 million populace is of Spanish descent.

Many of the problems common to North America are beginning to have their effect in Chile, for example air pollution. The capital, Santiago, experiences bad smogs, mainly from vehicle exhaust, but water pollution is still not too serious. "Matter of fact, the south's a fisherman's paradise. There's nothing smaller than three-pound trout in the rivers and marlin and swordfish are common deep-sea catches."

At 70 years of age, many men would begin to consider retirement. Not Maxwell Styles. "As we say in Spanish, I'll die with my boots on," he says. [

## Manic 5 starts up

The first unit at Manic 5, largest station in Hydro-Quebec's massive Manicouagan-Outardes hydro-electric complex, has begun feeding power into the province's power network.

Two more units will come on line before the end of the year and all eight, bringing the plant's capacity to 1,320,000 kilowatts, are slated for commissioning before the end of next year — several months ahead of schedule.

Power generated at Manic 5 is transmitted 67 miles at 315,000 volts to one of two central sub-stations that collect energy from the various stations in the complex. From there it is moved to Quebec City and on to Montreal, a distance of more than 400 miles, at 715,000 volts.

Manic 5 is supplied with water from a 750-square-mile reservoir created by the dam. The reservoir, which also regulates flow to other Manicouagan River plants further downstream, is the largest man-made lake in North America. Manic 5 is the fifth station in the seven-plant complex to come into service. [

## Dry-cell laser

Bell Laboratories has come up with a new laser, smaller than a grain of sand, that can be powered by ordinary dry-cell batteries. It will emit a beam of infrared light.

The new laser is a semi-conductor device that operates continuously at normal room temperature.

Such lasers offer great potential in the transmission of voice and data signals in high-capacity optical communications systems. [

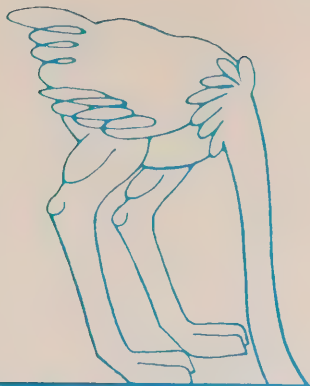
## Wells turns on

The fourth hydro-electric generating station to tap the Mississauga River has begun feeding kilowatts into the provincial grid.

Ontario Hydro's \$28.9 million Wells generating station came on line early last month. With the completion of its second unit, Wells will have a 203,300-kilowatt capacity.

One of its last hydraulic plants in Hydro's current construction program, Wells is unusual in several ways. It does not have its own headpond, but shares a 12-mile artificial lake with the George W. Rayner station, about 900 feet to the east. Its tailrace channel, to return water to the river, measures 3,000 feet, one of the longest in the province. [





## as don wright sees it

Columnists of renown in the newspaper world are rumored to receive all sorts of buckshee benefits such as a complimentary pass to the Royal Gladiola Society's annual bloom-in or an honorary position in the front ranks at an outing of the Single Breasted Hornbill Watchers Association of downtown Applehill. They are said to accept these with ennui and as a matter of course.

It's different with us. Laboring as we do on behalf of the more obscure and esoteric world of pure science, we seldom receive this kind of recognition. But it's come at last — in the form of a handsomely bound collection of the selected papers of Dr. M. M. Frocht. We get to keep them in the event we review them in this column.

And since a retail price of \$18.50 is discreetly suggested on a tiny sticker on the back cover, we intend to comply. The book will make just the right gift for our snappy old aunt Isobelle who has been saving elastic bands since the turn of the century and always comes through in the stretch.

Entitled simply "Photoelasticity", the book starts out slowly enough but loses momentum gradually until grinding close to a halt on page three. The remaining 400-odd pages are inclined to be dull. It's a shame really, considering the depth and warmth of material at the author's disposal and the wide general interest that prevails in the use of three-dimensional photoelastic analysis of statically indeterminate structures.

Photoelasticity has been thoroughly researched and, until the last few chapters, is refreshingly free of the morbid preoccupation with sex which seems to dominate contemporary literature. The book falls short of its potential mostly, we suspect, for lack of imagination on the part of the author. Dr. Frocht has everything going for him in the section dealing with the analysis of Vierendeel trusses, for example, but fails to make the most of it.

Considering the prevalence of hernia in today's society, affecting both sexes and all age groups, a learned discourse on the trusses and other paraphernalia and techniques available for relief would seem to offer universal appeal. Instead, the doctor confines his observations to the aforementioned truss and is pretty autocratic in his conclusions. He admits, however, that longitudinal stresses plotted by the flexure formula do not agree precisely with those obtained photoelastically "at the fillets, outside corners and at the point of application of loads."

One further criticism we feel called upon to register is the author's almost dishonest use of the over-sell technique in conjunction with his section headings. It's like using a picture of a naked lady about to be gobbled up by a leering ape on the cover of a pocket book which is devoted inside to a treatise on the personality problems of the female fruit fly.

At one point, for instance, the reader is teased by the title "Stress Concentration Factors Around a Central Circular Hole in a Plate Loaded Through a Pin in the Hole."

Juicy and all as it sounds, the impatient reader will be discouraged by the pedantic introduction and the success the author has achieved in burying the more pungent stuff among a plethora of formulae and equations. His talent for descriptive detail nevertheless shines through and he is at his best in describing the complex relationship between the size of the pin, the diameter of the hole and the applied load. (Some readers may be surprised to learn that lubrication of the pin had only a minor effect on stress concentration.) \*

Unfortunately, the author gets carried away with his own rhetoric and goes on in such sordid detail as to render the book quite unfit for minors and the less sophisticated. To quote a more innocent passage: "The spread in the stress concentration factors shown for a given ratio ( $2r/D$ ) is largely caused by the effect of the clearance between the pin and the hole and the head distance."

At this point we thought someone had slipped in a copy of *Sex and the Single Girl* and we put the book away lest a member of the morality squad be attracted by the sizzle. Snappy old aunt Isobelle will have to settle for *Sensuous Woman* or some other prosaic tome more in keeping with her genteel upbringing.

■ This is the age of protest and it has been marked, among other ways, by a frenzied cultivation of hair in a number of places formerly considered best left bereft. Whether or not there is any connection

\* A colloidal graphite grease was employed.

between beards, sideburns and disestablishmentarianism is a moot point but there is evidence to suggest that there is. Certainly, the beard has been grown as a threat since time immemorial and still crops up in that role today.

Earlier this year, for example, some gas company workers, mostly male we imagine, grew beards in support of their fellow workers who were on strike. Their thought was to embarrass management which, they knew, was concerned with the appearance of the employees and their effect on the corporate image.

And there was another hair-raising experience in India recently in a strong bid for power by the men of Tumarikop. They have vowed to let their beards grow until the government brings electricity to their village.

Whatever the philosophy behind all this hair, there is no doubt that it can be used to advantage in frightening children, frustrating management and infuriating barbers. The beard also appears to possess magical properties which can, superficially, at least, transform a gentleman into a rogue, a miser into a Santa Claus and a dumbbell into a sage.

■ All this preoccupation with hair has not gone unnoticed by the scientist, you may rest assured, and the inevitable treatise has now made its appearance establishing the relationship between sexual activity and beard growth. Published in *Nature*, an authoritative international journal of science, the discourse asserts that, beyond any reasonable doubt, the more you diddle about, the more you are going to have to shave.

The scientist in question was prompted to investigate the phenomenon when, after periods of several weeks on a remote island, he found his beard growth slowing down to a snail's pace. It picked up noticeably on the days before he was to leave and reached great heights during the first day or two of cavorting on the mainland. Even the presence of a female after a period of separation was enough to set this fellow's beard to sprouting like mad.

Conversely, while sex seemed to act like a fertilizer, he found that excessive physical exertion of the gymnasium type had the opposite effect — a useful fact to tuck away for anyone wishing to raise a luxurious beard in a hurry.

Even if the investigations don't prove particularly meaningful, the author has obviously had a lot of fun in the process. And don't feel sorry for the fellow with five o'clock shadow who has to shave twice a day. He probably leads a very interesting life. □



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